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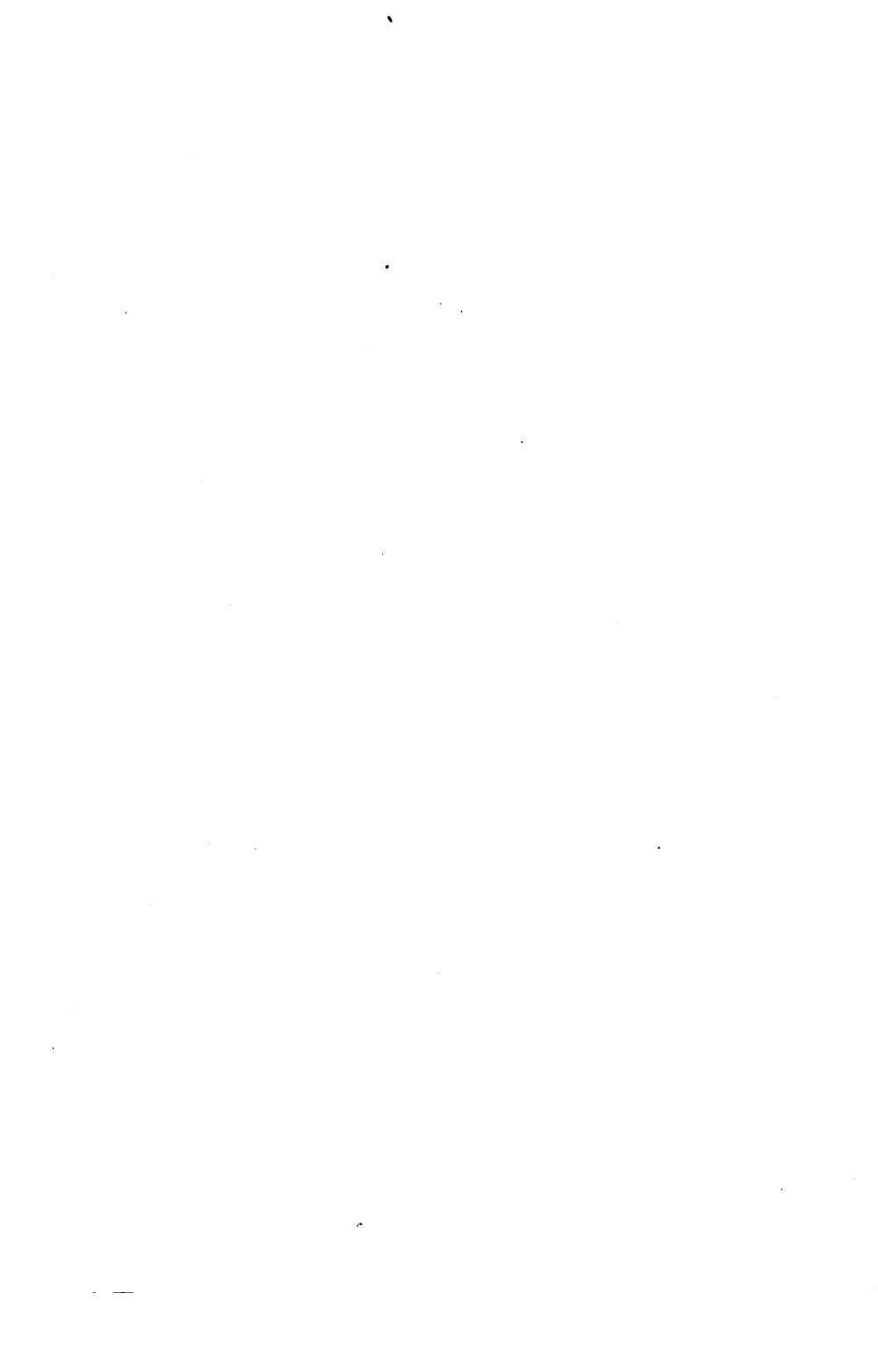


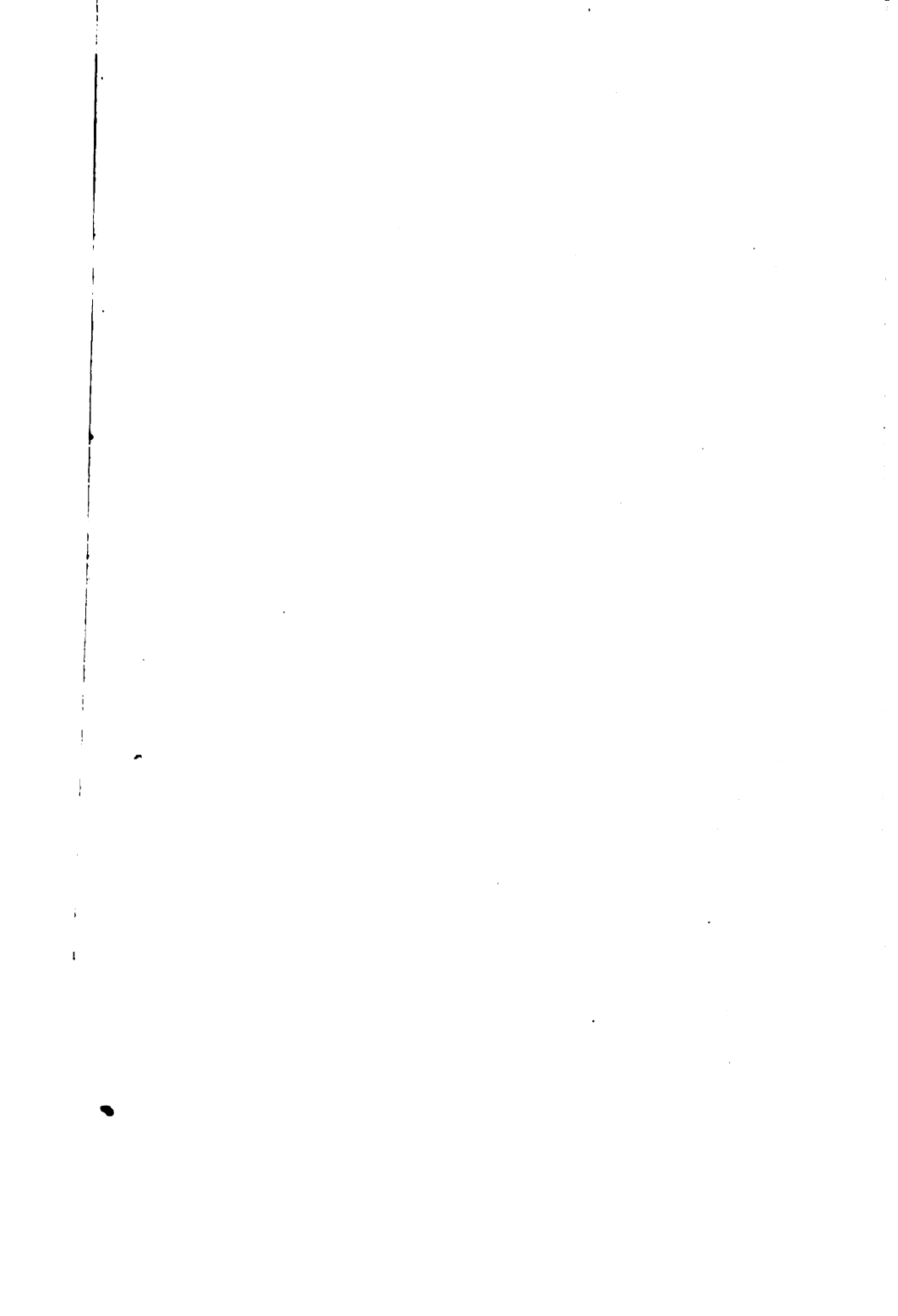
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**FROM THE BOOKS
OF
MISS EUGENIE HUBBARD**







THE SACRED TANK, ULWAR

The Sacred Pool of Ulwar with its surroundings form one of the most beautiful as well as historic sights in all India. The Tomb of a native Chieftain, Bakhtawa Siugh stands on one side, temples dedicated to Vishnu on the other.

ADAIR'S NEW ENCYCLOPEDIA

COMPLETE — CONCISE

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VOLUME ONE

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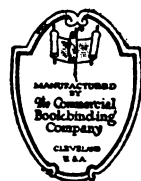
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Foreword

There has never been greater need for a concise, complete and comprehensive encyclopedia than at the present time.

A new world has arisen, with new countries, new men, new ideals, and new problems. With a keen realization of this condition, and of the growing need for a practical encyclopedia for daily use, the publishers have made, and now offer, what they believe to be a most complete, comprehensive, workable and up-to-date encyclopedia.

In the treatment of subjects, the editors have borne in mind the practical use of the encyclopedia. It is a work to be consulted quickly and readily for every day use by the business man, the student, the housewife and the children. Everything in human history and activity, in science, art and literature has been treated fully with such conciseness that the substance can be absorbed rapidly and intelligently.

For school use it will be found invaluable for quick and accurate reference. While no subject of importance is omitted, particular stress has been laid upon those which are timely and which are in a line with modern human interest and development. All forms of scientific progress are given ample treatment.

The biographies of the men and women who have made and are making history will be found in these pages.

The maps, without which no encyclopedia can be complete, show in detail the new divisions and sub-divisions of territory resulting from the World War. The story of the war itself is told in a masterly narrative, complete yet concise.

The events and conditions following the war are elucidated fully and clearly. Not only under each country is the participation of that country in the war told, but under separate titles are described the great battles and events of the gigantic struggle.

The latest available statistics have been used, in connection with the description of all important cities and towns, and even towns of less importance possessing historical interest, have been included. The names of rivers, mountains, forest reserves, parks and other important natural features have been included. The editors believe that in this respect this encyclopedia is more complete than any ever published. The use of long tables which quickly lose their value and become obsolete have been avoided as much as possible.

The publishers and the editors confidently believe that this New Encyclopedia will be of the greatest possible value as a complete, concise and practical work of reference.

THE EDITORS.

A

A initial letter of Eng. alphabet, practically identical with Greek and Roman form, derived from Phœnician aleph (V), whence Greek alpha. Primary vowel sound in all languages is the open back vowel, as in psalm; has at least six distinct sounds in English—e.g., father, man, make, air, what, afar. In logic, the universal affirmative. In music, the sixth note of the diatonic scale of C (philharmonic pitch 439 vibrations per second). In Morse signalling (army) known as *Ak*, and represented by :—

AACHEN, OR AIX-LA-CHAPPELLE, tn., Prussia (50° 46' N., 6° 6' E.); Charlemagne's cap. and burial-place; treaties signed here, 1668, 1748, 1818; coal and iron fields, various hardware manufactures; sulphur baths; Ludendorff's headquarters during siege of Liege. Pop. 156,000.

AALAND OR ALAND ISLANDS, about three hundred islands, Gulf of Bothnia (60° 10' N., 20° E.); eighty inhabited; cereals, cattle. Taken from Sweden by Russia (1809); used temporarily by Germans as advance base (Great War, March, 1918); neutralized by Peace Conference (1919) and fortifications demolished; plebiscite for self-government (1919). The islands were awarded to Finland by the League of Nations in 1920. Area, 556 sq. m.; pop. 18,500.

AALBORG, in N. Jutland, on the S. side of Limfjord, is a cathedral tn. and the seat of the bishopric. It exports cattle hides, wool, dairy produce; imports coal, salt, petroleum, and grain; Brit. vice-con.; pop. 71,000.

AALPASHA (1815-71), Turk. politician; five times grand vizier.

AAR(E) (47° 30' N., 8° 13' E.), large Swiss river; joins Rhine at Coblenz; nearly 200 miles long.

AARAU (47° 24' N., 8° 2' E.), capital of Aargau, Switzerland; foundries. Pop. 10,700.

AARD-WOLF (earth-wolf), Dutch name for *Proteles cristata*, a S. African

hyena-like mammal with an erectile mane, of burrowing habits, feeding on carrion and white ants.

AARGAU (47° 25' N., 8° 10' E.) N. Swiss canton; area, 542 sq. miles; admitted Swiss Confederation, 1803; capital, Aarau. Pop. 241,000.

AARHUS, second port in Denmark; has a good harbor, improved 1880-90; exports grain, flour, dairy produce, oysters, and tallow; imports coal, timber, wine, sugar, tobacco, and manufactured goods; it has long been the seat of a bishop and has a large cathedral; pop. 75,000.

AARON, the bro. of Moses, is prominent in some parts of the narrative of the Exodus and Wanderings, but his importance varies considerably in different strata of the tradition. In the earlier narrative, J and E, he is represented as acting with Moses, but in such a way that some think his name is an editorial insertion. A. stays with the Israelites when Moses and Joshua go up the mountain for the tablets and the Law, and A. makes the Golden Calf (under which form Jahweh was probably worshipped in early times). In the later traditions, those of the Priestly Code, A. is much more prominent. Like his bro., he receives the divine commands, and he appears definitely as high priest, performing all the ceremonies of his office. This characterization of him must be post-exilic, when the priestly system was established. It is very difficult, if not impossible, to say what amount of hist. information we really have about him, but in any case he is more shadowy than Moses. One authority thinks he is a 'traditional head of the priesthood and cult of Bethel.' He is certainly connected with the priesthood, and the Aaronites and the rest of the Levites are distinguished. The etymology of the name is obscure, and may have been taken over by the Hebrews from some of their Canaanitish or N. Arab. neighbors.

AARON'S BEARD, popular name for several plants having some fanciful resemblance to a beard, e.g., strawberry

geranium, rose of Sharon, Kenilworth ivy, etc.

AB, the eleventh month of the Jewish civil year, corresponding to a part of July and a part of Aug.: it does not occur in the A.V. of the Bible, but is often found in the Talmud.

ABACA (*Musa textilis*), native name of plant from which manila hemp is produced.

ABACO, see **BAHAMAS**.

ABACUS, upper part of capital of a column, supporting architrave; also from Rom. times frame with beads running on wires, used for calculating.

ABALONE, Californian name for *Haliotis*, or ear-shell, a shell-fish known in Channel Islands as *ormer* (*orielle de mer*).

ABARBANEL, JACOB RALPH (1852-1922), son of Rudolph and Rosalin Abarbanel. Received his early education in the schools of New York City and graduated the College of the City of New York in 1872. Graduated in Law at Columbia University in 1874. Has practised law in New York since that date. While a lawyer he has made his greatest reputation as a writer both of fiction and as a dramatist. His best known works are *Flirtation*, in 1884; *The Rector's Secret*, 1892; *The Heart of the People*, 1908; also many serials published under the pen name of 'Ralph Royal.' His plays include *A Model Pair*, 1882; *Haydee, Countess of Monte Cristo*, 1902; *The Heart of the People*, 1909. He has also translated many stories from the French and German. Married Cornelia L. Eaton, June 30, 1892.

ABATEMENT, legal act of mitigation; of freehold, wrongful entry by stranger after death of owner and before heirs; of legacies, reduction on account of insufficiency of estate; of contracts, proportionate reduction of purchase money on account of misrepresentation; of nuisances, removal; of revenue taxes, deduction; of criminal proceedings, abandonment without consent of prosecutor; heraldic, mark of dishonor.

ABATTIS, in anc. times merely a rampart of sharpened stakes or felled trees, with branches extending outwards. In modern warfare great use is made of barbed wire. See **BARBED WIRE**.

ABATTOIR, the name given to the public slaughter-houses estab. in Paris by a decree of Napoleon finished 1818; first estab. in Gt. Britain at Edinburgh, 1851; Islington, 1855; now in all tns. where many cattle are slaughtered: under careful inspection to prevent the sale of un-

wholesome meat. The site should be outside the city, within easy access of the cattle market: the floors and walls to a certain height should be tiled to prevent absorption; all woodwork should be avoided, and proper accommodation for killing, dressing, and cooling should be provided; the offal should be destroyed or removed immediately; this can be used for manure; there should be a separate chamber for the preparing of the feet and intestines.

ABBAS I., 'the Great' (1557-1628), Pers. monarch, extended his kingdom from the Tigris to the Indus; though an enlightened ruler, was revoltingly cruel in his domestic conduct.

ABBAS I. (1813-54), Egyptian pasha, assisted Turkey in Crimean War; was assassinated.

ABBAS II. PASHA HILMI (1874), ex-Khedive of Egypt. Eldest son of Khedive Mehemet-Tewfik. He was educated at schools in Vienna and traveled much before his elevation to throne of Egypt. This occurred in 1892 upon death of his father. He early showed antagonism to British control of Egypt and in 1893 dismissed most of his Cabinet for not upholding him in his anti-British attitude. Lord Cromer interfered and he finally agreed to follow in all important matters, especially foreign, the dictates of the British Government. At the outbreak of the World War the Khedive was on a visit to Constantinople, a guest of the Sultan of Turkey. Here he openly joined Turkey in alliance with Germany. On Dec. 18, 1914, the British Foreign Office announced a protectorate over Egypt and on the next day Abbas Pasha Hilmi was deposed as 'having adhered to the King's enemies.'

ABBASIDES (Caliphs of Bagdad from 750-1258), second of the two great dynasties of the Mohammedan Empire; claimed descent from Abbas (A. D. 566-652), Mohammed's uncle.

ABBAZIA, a tn. in Jugo-Slavia. Its position on the Bay of Fiume, and its warm climate, make it a favorite health resort. It is noted for its gardens and pretty villas. Pop. 2 000.

ABBE, originally the Fr. term for abbot. Before the Fr. Revolution it was applied to many persons who had little or no connection with the church but who acted as tutors, professors, and men of letters. 'Abbes commendataires' were persons who received revenues from their monasteries, but who were not necessarily monks.

ABBE, CLEVELAND (1838-1916),

ABBE, ROBERT

Amer. meteorologist and astronomer; director of Cincinnati Observatory, and meteorologist to the U.S. Army Signal Service. Did much work in the preparation and issue of 'storm warnings' and 'probabilities.'

ABBE, ROBERT (1851), son of George Waldo and Charlotte Colgate Abbe, brother of Cleveland Abbe. Surgeon. Graduated College City of New York, 1870, M.D. College Physicians and Surgeons, Columbia, 1874. Attending surgeon New York Hospital, 1877-1884. Prof. didactic surgery Woman Medical College; surgeon St. Luke Hospital since 1884, New York Cancer Hospital since 1883. Attending surgeon New York Babies Hospital, 1892-1897. Prof. surgery New York Post Graduate Medical School, 1889-1897. Consulting surgeon Roosevelt, Women's and Babies hospitals. Lecturer New York College of Physicians and Surgeons. Contribution to Scientific magazines.

ABBEVILLE a tn. near the mouth of the R. Somme in N. France. It is an important industrial and commercial center; manufs. woolen goods, rope, sacking; does a considerable trade in grains; and has dyeing and bleaching works. Historically it is noted for two treaties which were concluded there—one between Henry III. of England and Louis IX. of France in 1259, and the other between Henry VIII. of England and Francis I. of France in 1527. Pop. 25,000.

ABBEY, EDWIN AUSTIN (1852-1911), one of the foremost American figure-painters, was b. in Philadelphia. He was sent by Harper Brothers of New York to England in 1878 to gather material to illustrate Herrick's poems. These illustrations, together with his work on Shakespeare's plays, secured his fame. From 1891 to 1902 he was engaged on a series of panels, 'The Quest of the Holy Grail,' for the Boston Public Library, and in 1901 he was commissioned by Edward VII. to paint his coronation. Among his pictures may be mentioned: 'A May-Day Morning,' 'Fiametta's Song,' 'Crusaders Sighting Jerusalem,' 'Pot-pourri,' and 'A Measure.' In 1896 he was elected A.R.A., and in 1898 he became an R.A., gaining later the titles of Chevalier of the Legion of Honour and Member of the National Academy of Design of New York.

ABBOT (Syriac *Abba*, 'father'), a name of respect, originally applied to the aged; acquired a special meaning as the title of the head of a monastery. All

ABBOT, GEORGE

members of the monastery owe implicit obedience to the abbot, whom they elect, but for the taking of important steps he must receive their consent. From his diocesan the abbot receives the insignia of his office—mitre, crosier, ring, etc. The importance of the office is shown by the fact that abbots took part in the Councils of the Church, and sat in the legislative assemblies of various European countries. The title is still retained in the older monastic orders.

ABBOT, CHARLES CONRAD (1843), American naturalist, b. at Trenton, New Jersey. Author of *The Stone Age in New Jersey*, 1876; *Primitive Industry*.

ABBOT, CHARLES GREELEY (1872), son of Harris and Caroline Ann. Graduated at Massachusetts Institute of Technology in 1894, M.S. in 1895. Given D.Sc. in 1914 by Melbourne University. Assistant in Smithsonian Institute Astro-physical Observatory in 1895, director of same since March, 1907. Secretary Smithsonian since 1918. Also Secretary National Academy of Science. Engaged in original researches on the solar radiation. Conducted expeditions to observe total solar eclipses of May 29, 1900, May 18, 1901, January 3, 1908, and May 29, 1919. Studies of total amount and variability of solar radiation and the effect of its variability on climate. Draper medalist, Nat. Acad. of Science; Rumford medalist Amer. Acad. Arts and Sciences.

ABBOT, EDWIN HALE (1834), son Joseph Hale and Frances Ellingwood. Educated Boston Latin School, 1851. Graduate Harvard University, 1855. A.M. 1858, LL.B. 1862. Law Editor *Boston Daily Advertiser*, 1862-1870. Practised law in Boston 1862 to 1876. Removed to Milwaukee and became general solicitor and director Wisconsin Central Railroad, 1873-1878. Became vice president 1878 and active trustee operating road for bond holders. Later became president and treasurer Wisconsin Central R. R., Chicago, Wisconsin and Minneapolis R. R., and Milwaukee and Lake Winnebago R. R., 1890-1899. Established first car-ferry for entire trains across Lake Michigan between Manitowac and Ludington. Contributed to *North American Review* and *Scientific Magazines*. One of the founders of Union Club, Boston.

ABBOT, EZRA (1819-84), Amer. Unitarian and scholar, Bussey prof. of Biblical criticisms at Harvard (1872-84).

ABBOT, GEORGE (1604-48), nephew of George Abbot, Archbishop of Canterbury, fought on the parl. side in the Civil War. He wrote *Paraphrase of the*

Book of Job, 1640; *Vindiciae Sabbati*, or an Answer to Two Treatises of Mr. Broad, 1641; and *Brief Notes upon the Whole Book of Psalms*, 1651.

ABBOT, LEMUEL (1760-1803), Eng. portrait painter. His *Cowper* and *Nelson* are well known.

ABBOT, WILLIS JOHN (1863), American author, b. at New Haven, Conn., author of *Blue Jackets of '76*; *Blue Jackets of 1812*; *Battle Fields of 1861*; *Carter Henry Harrison*; *Story of Our Navy for Young Americans*, 1910. In 1922 he became editor of the *Christian Science Monitor*.

ABBOTSFORD, on the r. b. of the Tweed, about 2 or 3 m. to the W. of Melrose, was the home of Sir Walter Scott from 1812 until his death in 1832. It was formerly a small farm, which Scott bought in 1811. He built a villa there and called it Abbotsford, and continued until 1817 to add new buildings of the old baronial style, making it a picturesque and irregular estate. There is a large collection of books, curios, and paintings.

ABBOTT, ALEXANDER CREVER (1860), American physician, b. at Baltimore. Educated at Johns Hopkins Univ., and in Germany. Author of *The Principles of Bacteriology*, 1892; *The Hygiene of Transmissible Diseases*, 1899.

ABBOTT, ELEANOR HALLOWAY (MRS. FORDYCE COBURN) (1872), daughter of Rev. Edward and Clara Abbott. Educated at private schools and took special courses in Radcliffe College, Cambridge, Mass. Has written extensively for magazines both short and long stories and is the author of the following well known books of fiction. *Sick-a-Bed Lady and Other Stories*, 1911; *White Linen Nurse*, 1913; *Little Eva Edgerton*, 1914; *The Indiscreet Letter*, 1915; *Molly-Make-Believe*, 1916; *Stingy Receiver*, 1917; *N'er-do-Much*, 1918; *Old Dad*, 1919; *Peace on Earth*, 1920; *Rainy Week*, 1921.

ABBOTT, EMMA (1849-91), American singer, b. at Chicago; studied music in Europe; appeared in opera at Covent Garden, and later, having formed a company of her own toured the United States. She d. at Salt Lake City.

ABBOTT, ERNEST HAMLIN (1870), son of Lyman and Abby Frances Abbott. Educated at Hill School, Philadelphia, A.B. Harvard, 1893, Union Theological Seminary, 1895. Graduate Andover Theological Seminary, 1896. Ordained Congregational ministry, 1896. Pastor First Cong. Church, Freyburg, Me., 1896-1902. Member editorial staff 'The

Outlook' since Feb., 1902. Secretary and director 'The Outlook' since 1913. Editorial correspondent with 'Outlook' in France, 1918-19.

ABBOTT, FRANK FROST (1860), son Thaddeus Marvin and Mary Jane Abbott. Educated private schools. Graduated from Yale in 1882. Ph.D. in 1891. Studied abroad at Berlin and Bonn universities in 1888-9, Rome, 1889. Became tutor at Yale in Latin, 1884 to 1891. Became member of faculty, University of Chicago, and associate professor in Latin, 1891. Professor, 1894-1908. Went to Princeton as Kennedy Professor of Latin in 1908. Professor Latin-American School Classical Studies, Rome, 1901-1902. Author, *Repetition in Latin*, 1900; *History and Description of Roman Political Institutions*, 1901; *A Short History of Rome*, 1906; *Handbook for the Study of Roman History*, 1906; *The Common People of Ancient Rome*, 1911; *The Spanish Pleas of Albercio Gentile*, 2 vols., 1921. Also articles in various American and foreign classical and historical magazines.

ABBOTT, JACOB (1803-79), an American author, b. at Hallowell, Me., U.S.A., and educated at Bowdoin College, where he graduated 1820, and at Andover. He entered the ministry of the Congregational Church, but he is best known by his writings—educational and religious, and books for the young. The chief are: *The Teacher*, *Hoary Head and McDonner*, *Summer in Scotland*, *A Series of Celebrated Sovereigns*, *The Rollo Books*, about 32 vols.; *Franconia Stories*, 10 vols.; *Marco Paul's Adventures*, 6 vols.; *Harper's Story Books*, 36 vols.; *American History*, 8 vols.; *The Harlie Stories*, 6 vols.; *Rollo and Lucy Books of Poetry*, 3 vols.; *Florence Stories*, 6 vols.; *Juno Stories*, 4 vols.; *August Stories*, 4 vols.; *Aboriginal America*, *The Discovery of America*, *Gentle Measures in Training the Young*, *Rollo's Tour in Europe*, 10 vols.; *Science for the Young*, 4 vols.; and *Beechnut Tales*. Many of his works have been pub. in England, and many have been trans. into foreign languages in Europe and Asia.

ABBOTT, JOHN STEVENS CABOT (1805-77), an historical writer, was b. at Brunswick, Maine, U.S.A. He was the brother of Jacob Abbott, and was educated at Bowdoin College and at the Theological Seminary, Andover; became Congregational minister at various places in Massachusetts and Connecticut; but soon turned his attention to literature. His chief works are: *The Histories of Marie Antoinette*, *Josephine*, *Mad. Roland*, *Cortez*, *Henry IV. of France*;

ABBOTT, JOSEPH

History of Napoleon Bonaparte, 1852-55; Napoleon at St. Helena, Confidential Correspondence of Napoleon and Josephine, History of the French Revolution, History of the Civil War in America, 1863-65; Lives of the Presidents of the United States, Life of Gen. U. S. Grant, 1868; History of Napoleon III., 1868; Christopher Carson, and History of Frederick the Great, 1871.

ABBOTT, JOSEPH CALDWELL (1825-82), an American journalist, b. at Concord, New Hampshire. Educated at Phillip's Academy, Andover; studied law and practised journalism at Concord; re-organized the militia of New Hampshire, and was a member of the commission for adjusting the boundary of New Hampshire and Canada. He was active during the civil war, and was chosen senator afterwards; he d. at Wilmington.

ABBOTT, LYMAN (1835-1922), son of Jacob and Harriet Abbott. Educated private schools. Graduated from New York University in 1853. Given D.D. degree by same university in 1876; D.D. by Harvard University in 1890; Yale in 1903; L.L.D. by Western Reserve University in 1900; Amherst, 1908. Admitted to New York bar in 1856. Ordained Congregational Minister, 1860. Pastor Terre Haute, Ind., 1860-65; New England Church, New York, 1865-69. Pastor Plymouth Church (succeeding Henry Ward Beecher), 1888-1899. Associate editor with Henry Ward Beecher, The Christian Union. Editor-in-chief the 'Outlook,' 1893-1922. Author of a vast number of works upon religious subjects as well as contributor to many magazines. His more prominent books include, *How to Study the Bible, Illustrated Commentary on the Bible*, 1875; *Study in Human Nature*, 1885; *Life of Christ*, 1894; *The Theology of an Evolutionist*, 1897; *Problems of Life*, 1900; *Henry Ward Beecher*, 1903; *The Great Companion*, 1904-05; *The Home Builder*, 1908; *The Spirit of Democracy*, 1910; *America in the Making*, 1911; *Reminiscences*, 1915; *What Christianity Means to Me*, 1921.

ABBREVIATIONS OF TITLES AND DEGREES. A.R.A.—Associate of the Royal Academy. B.A.—Bachelor of Arts. Bart.—Baronet. B.D.—Bachelor of Divinity. B.Sc.—Bachelor of Science. C.B.—Companion of the Bath. C.E.—Civil Engineer. C.I.E.—Companion of Order of Indian Empire. C.J.—Chief Justice. C.M.G.—Companion of Order of St. Michael and St. George. C.V.O.—Companion of Victorian Order. D.D.—Doctor of Divinity. D.Sc.—Doctor of Science. D.S.O.—Distinguished Service

ABDOMEN

Order. F.R.G.S.—Fellow of the Royal Geographical Society. F.R.S.—Fellow of the Royal Society. J.P.—Justice of the Peace. K.C.—King's Counsel. K.C.B.—Knight Commander of the Bath. K.C.M.G.—Knight Commander of Order of St. Michael and St. George. K.C.V.O.—Knight Commander of the Victorian Order. K.G.—Knight of the Garter. L.H.D.—Doctor of Humanities. LL.B.—Bachelor of Laws. LL.D.—Doctor of Laws. Litt.D.—Doctor of Literature. M.A.—Master of Arts. M.C.—Member of Congress. M.D.—Doctor of Medicine. M.P.—Member of Parliament. M.V.O.—Member of the Victorian Order. N.A.—National Academician. O.M.—Order of Merit. P.C.—Privy Councillor. Ph.D.—Doctor of Philosophy. R.A.—Royal Academician. S.J.—Society of Jesus. S.T.D.—Doctor of Sacred Theology. U.S.A.—United States Army. U.S.N.—United States Navy. V.C.—Victoria Cross.

ABDARRAHMAN, five Omayyad princes of Cordova: A. I. (756-88), founded Omayyad dynasty in Spain. A. II. (822-52), weak ruler. A. III. (912-61), attained caliphate. A. IV., caliph in 1017; murdered. A. V., caliph, 1023-24; murdered.

ABD-EL-KADER (1807-83), Amir of Mascara; for fifteen years opposed the conquest of Algeria by France, surrendered 1847, and on release, 1852, became friend of France.

ABDICATION, voluntary surrender of an office of trust; particularly of kings or heads of States. Important a's of later times are—James II., 1688, Napoleon I., 1814 and 1815, Louis Philippe, 1848, Milan of Serbia, 1889. The World War resulted in the abdication of several of the most powerful monarchs of Europe including William II of Germany, Charles of Austria, Nicholas of Russia and Constantine of Greece. See World War Austria-Hungary, Greece, Russia, etc.

ABDOMEN, the part of the trunk of the human body below the diaphragm which divides the cavity of the trunk (into the abdominal cavity and the thoracic cavity); further divided into the a. proper above and the pelvis below, the former containing the stomach, small and large intestine, liver, pancreas, spleen, and kidneys, and the latter the lower part of the large intestine the urinary bladder, and the internal genital organs. Internally the a. is lined with a serous membrane called the peritoneum, which covers the free surfaces of the abdominal organs and holds the intestine in place by means of a fold

ABDUCTION

called the mesentery, while another fold, the great omentum, covers like an apron the front of the greater part of the abdominal contents. Owing to the modern advances of medicine, and chiefly to the introduction of anaesthetics and antiseptic and aseptic surgery, opening the a. for the relief of disease is an everyday procedure, and one which, with due care, involves very little risk; and, as an aid to diagnosis in obscure cases, opening the a. by incision for the purpose of examining its contents is by no means unusual.

ABDUCTION is the act of any person who unlawfully takes, or causes to be taken, any unmarried girl under the age of sixteen years out of the possession, and against the will, of her parents or guardians; liable to two years' imprisonment, whether the girl consents or not, and whether the person charged believed her to be over the age of sixteen.

ABD UL AZIZ (1830-76), 32nd Sultan of Turkey; risings in Crete and the Balkans, Bulgarian atrocities, and a conspiracy forced him to abdicate (1876); assassinated some days later.

ABD UL HAMID I. (1725-88); Sultan of Turkey s. of Ahmed III.; succ. bro., Mustafa III., in 1773.

ABDUL HAMID II. (1842-1918). He became the 34th Sultan of Turkey on his accession to the throne in 1876, son of the Sultan Abdul ul Medjid. He came to the throne as a result of the deposition of his elder brother Murad V. At the very outset of Abdul Hamid's reign Turkey was almost overthrown by the defeat in 1877-78 she sustained at the hands of Russia. He was obliged to surrender territories in Europe and Asia by the terms of the Treaty of Berlin, signed July 13, 1878, and to recognize the independence of the Balkan States. In 1895-96 during the massacre of the Armenians he endeavored to appease the European powers by promising reforms. These reforms, however, never were put into operation. In 1897 Greece, on account of conditions in the Island of Crete, went to war with Turkey, later joined by Great Britain and Russia, who forced Turkey to evacuate the island. As he grew older the Sultan became steadily more despotic, so much so that he was called 'Abdul the Damned.' A revolt in Macedonia in 1908 forced the Sultan to restore the Constitution he had shoved aside thirty years before. Under the Constitution the new Turkish Parliament met on Jan. 15, 1909. On April 14 the Sultan again threatened to abrogate the Constitution but failed and the new Turkish party

ABEL, SIR FREDERICK

called the Young Turks captured Constantinople and with it the Sultan. Abdul Hamid was banished temporarily to Salonica. Again brought back November 12, 1912, to Constantinople, he was confined to a palace on the Asiatic side of the Bosphorus.

ABDULLAH, ACHMED, author and playwright. Contributor of many short stories to magazines. Has written *Grammar of Little Known Sanskrit Dialects*, 1902; *The Red Stain*, 1915; *The Blue-Eyed Manchu*, 1917; *Bucking the Tiger*, 1917; *The Trial of the Beast*, 1919; *The Man on Horseback*, 1919; *The Ten Foot Chain*, 1920; *Night Drums*, 1921. Also author of following plays: *Toto* (with Leo Ditrichstein), 1920; *The Grand Duke* (with Lionel Atwill), 1920; also compiler of *Tales of the Psychic*, 1920.

ABD UL MEDJID (1868); Caliph of Turkey elected in 1922 to succeed Mohammed VI., who was deposed in accordance with a decree of the Nationalist government. The Caliph has no political power but serves only as a successor of Mohammed as a religious leader of Islam. Abdul Medjid was cousin of the Sultan and was crown prince of Turkey prior to his succession as Caliph. See **TURKEY**.

ABD UL MEDJID (1823-61), Sultan of Turkey; succ. f., Mahmud II., 1839; concluded peace with Mehemit Ali, 1841; Crimean War undertaken by England and France in his defence.

ABDURRAHMAN KHAN, Amtr of Afghanistan (1844-1901); noted for political sagacity; improved social conditions of country, and, by grasp of affairs, materially increased its power. His rule consisted of a military despotism, and he succeeded in imposing an organized form of government upon a most unruly people; succ. by eldest s., Habibullah.

A BECKET, THOMAS, incorrect version of Thomas Beckett. See **BECKET, THOMAS**.

ABEL (Hebrew 'breath'), second s. of Adam; killed by bro. Cain; perhaps originally South Judæan demigod.

ABEL, SIR FREDERICK AUGUSTUS, Bart. (1827-1902), Eng. chemist, famous for researches in explosives; invented new method of manufacturing gun-cotton and cordite (jointly with Prof. J. Dewar); carried out researches with Sir A. Noble on explosion of black powder; invented apparatus for determination of flashpoint of petroleum; chemist to War Department; pres. Institution of Electrical Engineers, 1877;

ABEL, THOMAS

first director of the [Imperial Institute, 1887.

ABEL, THOMAS, Abell (d. 1540), Eng. priest; supporter of Katharine of Aragon; denied royal supremacy and was executed.

ABELARD, PIERRE (1079-1142), Fr. scholar and theologian; in early manhood became canon of Notre Dame, Paris, in which city he achieved great success as teacher and lecturer. He was made tutor to Héloïse, niece of Canon, Fulbert and an affection sprang up between them. They were afterwards separated, and an act of violence was committed upon A. at the instance of Fulbert. Subsequently A. became a monk, and Héloïse took the veil. In his later years A. resumed teaching at the Paraclete hermitage, where he was buried, and Héloïse was afterwards laid in the same tomb. The remains of the lovers were, in 1817, removed to Père Lachaise, Paris.

ABENCERRAGES, name of a noble family in the Moorish kingdom of Granada, the story of whose long struggle with the rival family of the Zegrís has been the theme of many Spanish chronicles and romance writers.

ABERAERON (52° 15' N., 4° 16' W.), seaport, Cardiganshire, Wales.

ABERAVON (51° 36' N., 3° 47' W.), town, Glamorganshire, Wales, municipal borough; engineering, tin, copper, and steel works. Pop. 10,500.

ABERCROMBIE, JAMES, Brit. gen., defeated by Montcalm in Canada, 1758.

ABERCROMBY, SIR RALPH (1734-1801), general, b. at Menstry, Clackmannanshire, educated at Rugby, and studied law at Edinburgh and Leipzig. Represented Clackmannanshire in Parliament for a while. He accompanied the Duke of York on the two disastrous campaigns against the Fr. in Holland (1793 and 1799), and by his skill and humanity gained the affection and admiration of the whole army. He was wounded during an engagement with the Fr. at Alexandria, Egypt, and though victorious, died a week later.

ABERDARE (51° 43' N., 3° 26' W.), town Glamorgan, Wales; principal industry, coal trade; iron trade has decreased since 1875; tinworks, brickworks, breweries. Pop. 53,500.

ABERDEEN, (59° 9' N., 2° 6' W.), seaport, royal, parliamentary, and municipal burgh, Scotland. Town built chiefly of grey granite (the Granite City); Consists of Old and New A.

ABERDEENSHIRE

Univ. (1494), including Marischal and King's Colleges (united, 1860); R.C. Cathedral, many churches, market cross, original structure dating from 1682, rebuilt 1842; numerous public buildings and hospitals; three parks, four bridges over Dee, chief northern seaport of Scotland; Industries include granite-quarrying, deep-sea fisheries, textile paper and jute manufactures, flax-spinning, brewing, distilling, jam manufacture; returns two members. A. obtained charter from William the Lion, 1179, in confirmation of David I.'s grant of corporate rights; burned by Edward III., 1336; rebuilt and enlarged; well fortified; looted by both Royalists and Covenanters; Old Pretender declared king here, 1715. Pop. 1921, 158,969.

ABERDEEN, South Dakota, a city and county seat of Brown co., on the Chicago, Milwaukee and St. Paul, Minneapolis and St. Louis, Great Western and Chicago, and Northwestern railroads. The city has numerous parks and fine drives. The buildings include many handsome public ones, municipal building, court houses, Federal buildings, and a public library. The business buildings are modern and up-to-date. Its educational features include besides good school buildings, a State Normal and Industrial School. The city is an important manufacturing center, especially of flour, brick, clothing, chemicals and machinery. The city was first settled about 1880. Pop. 1920, 14,537.

ABERDEEN, Washington, a city of Chehalis Co. It is situated on the Chehalis River and connected by the following railroads: Northern Pacific; the Chicago, Milwaukee and St. Paul; and the Oregon and Washington Railway and Navigation Co. Steamship lines connect it with ports on the Pacific coast. It is a shipping point both for lumber and agricultural products, both of which are important. The chief industries include shipyards, lumber and by-products, farm and dairy outputs and several packing houses. Pop. 1920, 15,337.

ABERDEENSHIRE (57° 18' N., 2° 33' W.), N.E. county, Scotland; area, 1971 sq. miles; has five districts—Mar. Formartine, Buchan, Garioch, Strathbogie; Includes several branches of Grampians, among chief peaks being Ben Macdui, Cairntoul, Lochnagar; principal rivers, Dee and Don, noted for salmon; largest lake, Loch Minch. Peterhead, Fraserburgh, Pannanich have chalybeate springs; geological formation, mainly crystalline schists; grouse, partridges, red deer abundant; has ash, fir,

larch trees. Agriculture most important industry: oats and barley grown: cattle fattened. Many coast villages engaged in fishing. Other industries include granite quarrying, brickmaking, brewing, distilling. A. sends two representatives to Parliament, besides two for Aberdeen town. Original inhabitants Picts; after Norman Conquest Malcolm Canmore defeated Celts here; temporarily Bruce's headquarters; feuds carried on by great families for many years; was long episcopal stronghold; scene of various engagements between Cavaliers and Covenanters, and of Jacobite risings of 1715, and 1745. Pop. 1921, 300,980

ABERDEEN, GEORGE HAMILTON GORDON, FOURTH EARL OF (1784-1860), statesman and prime minister of England. Educated at Harrow and Cambridge, and in 1801, on succeeding to the earldom, travelled in Greece; hence Byron's oft-quoted line, 'The travelledthane, Athenian Aberdeen.' Ambas. at Vienna (1813), and signed the treaty of Toplitz. Entered political life as a Tory, and became successively Chancellor of the Duchy and Foreign Secretary in Wellington's cabinet (1828-30), but although he held office (Colonies and War) under Peel (1834-5 and was again Foreign Secretary (1841-6), he gradually abandoned his high Tory principles and resigned with Peel in 1846. In 1852 succeeded Lord Derby as prime minister, forming a popular 'coalition ministry.' His ministry soon met with disfavor owing to the mismanagement of the Crimean war, and he resigned after the carrying in the House of Commons of Mr. Roebuck's motion of censure.

ABERNETHY, JOHN (1764-1831), Eng. surgeon; assistant-surgeon at St. Bartholomew's Hospital, London, and founder of the medical school; known for his treatment of aneurism.

ABERRATION, deviation of mind from the normal; of light, see **LIGHT**.

ABESHE (14° 8' N., 21° 2' E.), capital, Wadal. Fr. Equatorial Africa.

ABHEDANANDA, SWAMI (1866). Educated Calcutta University. Member of Sanyasius said to be the most ancient order of monks in the world. Came to the United States in 1897 and organized in New York City the Vedanta Society. Also established a school for the Comparative Study of Religions at W. Cornwell, Conn. Has lectured on Hindu philosophy before many educational societies and associations. Author of the following works, *Reincarnation*, 1899; *Spiritual Unfoldment*, 1901; *How to be a Yogi*, 1902; *Self Knowledge*, 1905; *Human Affection and Divine Love*,

1911; *Great Saviors of the World*, 1911; *India and Her People*.

ABIGAIL, wife of king David (1Sam.) in Elizabethan times and later colloquial name for waiting-woman.

ABIJAH, name of more than one Biblical character, of whom the chief was the son of King Rehoboam. He was engaged in war with and defeated Jeroboam, the other kings of the then divided kingdom of Palestine.

ABILENE, a city of Texas, in Taylor Co., of which it is the county seat. It is on the Texas and Pacific, the Wichita Valley, and other railroads. It is an important industrial community and has flour and planing mills, cotton oil mills, and cotton gins. Among the public buildings are a sanitarium and a Federal courthouse. There is a library, parks etc. Pop. 1920, 10,234.

ABIMELECH, Philistine king; took Sarah into his harem, Abraham having represented her as his sister, not his wife. She was restored in response to a divine command given in a dream.

ABINGTON, Massachusetts, a city of Plymouth co., about 20 miles southeast of Boston. It is connected by rail by the New York, New Haven and Hartford railroad and the Old Colony Electric railroad. The city is noted for its fine schools and has a city library. There are many beautiful drives and notable parks, in one of which is located the new Civil War monument. Its manufactures are extensive although confined principally to one output, mainly boots and shoes. Abington is historically interesting, the town having been founded in 1680. Pop. 1920, 5,787.

ABIOTENESIS, spontaneous generation; the origination of living animals and plants from non-living matter, has been more and more discredited by modern biological research and finally disproved by Pasteur's experiments on Sterilization. This of course, does not bear on the question whether protoplasm may be created from inorganic matter.

ABKHASIA, OR ABASIA, a dist. in Caucasia. Has been dominated by many nations from the time of the Romans onward, but now under Russian rule. Annexed by Russia in 1809, but not pacified till as late as 1864. Chief industry wheat and vine growing. Pop. 30,000.

ABLUTION, an act of cleansing; a religious ceremonial symbolizing the purification of the spirit. In the R. C. Church the term refers to the washing of the chalice and the priests' bands after **COMMUNION**.

ABNER Old Testament character; defended Ishbaal, Saul's against David killed at Hebron.

ABO important tn. in Finland, and formerly cap., situated on the Aurajoki R. not far from its mouth. Its university founded in 1640, was removed to the present cap., Helsingfors, after the disastrous fire which destroyed its buildings and most of the tn. in 1827. Important shipbuilding and timber trade. Pop. 60,000.

ABOLITIONISTS name of party in the United States who demanded the abolition of slavery. Although many individuals had held opinions hostile to slavery, especially among the Quakers, it was not until 1774 that Benjamin Franklin presided over their first congress in Philadelphia. Towards the end of the third decade of the nineteenth century the movement against slavery began to make great headway, and in 1831 one of its chief leaders, William Lloyd Garrison (q.v.), began to pub. its organ, the *Liberator*, in Boston. The New England Anti-Slavery Society formed in 1832, became the nucleus of the great political party which influenced and finally (1856) merged with the republican party. The feeling against the A. was naturally very strong in the S. or slave-owning states, the legislature of Georgia even going the length of offering a reward of \$5000 to any one who could secure the conviction of Garrison. Even in his own city of Boston, Garrison was severely handled by the mob. No doubt much of the unpopularity incurred by the A. was due to the practical assistance rendered to runaway slaves by an organization called the 'Underground Railway.' The A. ideals finally triumphed when President Lincoln proclaimed the freedom of the slaves on January 1, 1863.

ABOMY a walled city, formerly the cap. of Dehomy, the negro kingdom of W. Africa, about 70 m. from the present cap., Porto Nova. It was occupied by the Fr. when they conquered Dehomy in 1892. Has an extensive trade in palm oil, gold, and ivory. Pop. 70,000.

ABORIGINES, legendary people of Latium; name applied to original inhabitants of any country.

ABORTION, premature expulsion of the human foetus from the uterus or womb; the term is applied in medicine to such an expulsion before the sixth month of intra-uterine life, 'premature labor' being the term applied to later expulsion; popularly 'miscarriage' is the name given to accidental premature expulsion, a. being confined to expulsion

induced for medical reasons or performed criminally. With the advance of obstetrical science a. and inducement of premature labor are being abandoned to a great extent as medical procedures. Criminal a., or attempt to procure criminal a., is a felony punishable by penal servitude or imprisonment.

ABOUKIR, (31° 18' N., 30° 5' E.) small town, Egypt; Nelson destroyed Fr. fleet in A. Bay, 1798; Bonaparte defeated Turks, 1799; captured by Sir Ralph Abercromby, 1801.

ABOUT, EDMOND (1828-85), Fr. novelist and journalist; b. Dienne (Lorraine); correspondent of the *Soir* during Franco-Ger. War; member Fr. Academy (1884); fame rests chiefly upon his novels.

ABRACADABRA, word much used as spell by necromancers; now term of contempt, rubbish.

ABRAHAM, the patriarch and ancestor of the Jews, according to tradition was originally called Abram. The stories of A. in *Genesis* are found in J. E. and P., the component documents of the Hexateuch, and are not always consistent, (e.g., the age of Ishmael. Modern criticism has left it very doubtful to what extent these narratives can claim to be hist.; A. may have been a real person, or a traditional ancestor. It is quite probable that the Israelites as a tribe came from Haran as A. is represented as doing, and before that from Ur in Babylonia, but the detailed historicity of the narrative is quite unproven.

'ABRAHAM'S BOSOM,' denotes Paradise; at ancient feasts each guest reclined with his head on his neighbor's breast, hence application of term.

ABRAHAM, PLAINS OR HEIGHTS OF (46° 46' N. 71° 10' W.), beside Quebec, above St. Lawrence; where Wolfe defeated Montcalm, 1759; now public park.

ABRAMS, LE ROY (1874), son James DeWitt and Almina Barbara Abrams. Educated at University of California, 1895-96; Stanford University 1896-99 and 1900-1904, A. B. 1899. Studied Columbia University 1904-05. Ph. D. degree 1910. Assistant in botany, Stanford University, 1900-02; Assistant Curator of plants, National Museum 1905-06. Assistant professor of botany 1906-1912. Professor 1912-1920 and since 1920 Professor and Curator Dudley Herbarium, Stanford University, Calif. Has contributed much to scientific magazines and publications. Author of *Flora of Los Angeles and Vicinity*, 1904; *Illustrated Flora of the Pacific States*, 1922.

ABRANTES (39° 29' N., 8° 11' W.), town Portugal, taken by Junot (later Duc d'A.), 1807. Pop. 6400.

ABRASIVES, the name given to substances which are used in polishing and grinding. They include tools fashioned from natural materials, such as grindstones, whetstones, etc., and mineral substances used in different forms. The most familiar abrasive is the grindstone, which is known from the earliest times. It is made from sandstone which is found plentifully in many parts of the United States. The requirements for unusually hard steel upon which ordinary abrasives had no effect resulted in the invention and discovery of others which were sufficiently hard to sharpen steel. Among the best known are alundum, and carborundum, or carbide of silicon. One of the newest forms of abrasives is electrite, which is a composition between alundum and carborundum. Carborundum and other abrasives are made in large quantities at Niagara Falls, where the water power is used by great plants which have been established there. Carborundum is a compound of silicon and carbon and is produced by a process which was devised by E. G. Acheson. Carborundum wheels have largely displaced lathes as a means for finishing axles, piston rods and rolls. Their accuracy is very great and they require about one-third of the time required by a steel tool.

ABROGATION: (1) In canon law the annulling of any previous law either by decree or disuse. (2) In Eng. law the reversion or repeal by a higher legislative authority of the order of a subordinate court.

ABRUZZI MOLISE, (42° N., 14° E.), mountainous provinces, Italy, including Teramo, Aquila, Chieti, Campobasso; largely pastoral; many inhabitants emigrate. Pop. 1,480,000.

ABRUZZI, LUIGI AMADEO GIUSEPPE MARIA FERDINANDO FRANCESCO DI SAVOIA-AOSTA, DUCA DI, son of Amadeo, Duke of Aosta, was b. at Madrid on Jan. 29, 1873. He ascended Mt. St. Elias, in Alaska, in 1897; beat Nansen's record in his polar expedition of 1900; ascended highest peak of the Ruwenzori Mts. in central Africa, in 1906; Mt. Kenia in British E. Africa in 1909. He served with distinction in The World War.

ABSALOM, 3rd and favorite s. of David, k. of Israel; famed for handsome looks; caught by long hair in branches of tree, and killed by Joab.

ABSCCESS, a localized collection of

necrosed and liquefied material in the tissues of the body, due to bacterial infection and inflammation; wherever possible it should at once be opened and the contents allowed to escape, and then healing will ensue.

ABSENTEEISM, term applied to landed proprietors who derive their income from one country, and spend it in another in which they live; long prevalent in Ireland.

ABSINTHE, alcoholic liquor flavored with wormwood and other herbs; use forbidden in Fr. army and navy, and all traffic in it against Belgian law. See **SPIRITS**.

ABSOLUTION, term used in ecclesiastical law for 'acquittal' from either guilt of sin or penalty of it; generally granted after confession.

ABSORPTION, the transformation of light into another form of energy, such as heat, when passing through a medium. A body which absorbs all the incident radiations is called black, as lamp-black or platinum black.

ABSTRACT. In law, the brief statement of the prin. fact in a document—used now generally with relation to the purchase of land—the A. being furnished by the vendor to the purchaser; in time it extends about 20 years back, and tabulates births, marriages, deaths, etc., which have relation to the land in question. If not satisfactory the purchaser must object within a certain period.

An A. thought of term has regard only for qualities or essences without reference to individual or particular things, (e.g.) wisdom.

ABSRDUM, REDUCTIO AD, indirect method of proving a proposition by showing that, were it not true, the consequence would be absurd; or of disproving a proposition by showing that, if true, the conclusion would be ridiculous.

ABT, FRANZ (1819-85), Ger. composer; wrote many songs, best known being, 'When the swallows homeward fly.'

ABU SIMBEL, IPSAMBUL, name of group of three rock-hewn temples constructed by Rameses II. (c. 1250 b.c.), on bank of Nile, in Nubia; principal one discovered by Burckhardt (1812), opened by Belzoni (1817).

ABUTILON, large genus of tropical shrubby plants, order *Malvaceae*, cultivated in greenhouses as Ind. mallows.

ABYDOS (26° 10' N., 31° 55' E.), town upper Egypt; founded by pre-Mentite kings; temples, forts, tombs built

from 1st to 30th dynasty, 5500-500 B.C.; declined from Ptolemaic period; ruins of Seti I.'s Great Temple, tombs, and forts still remain; place sacred to Osiris, whose cult began here in 12th dynasty.

ABYSSINIA, an inland country situated by the Red Sea between 5° and 15° N. lat. and 35° and 42° E. long. It has an area of about 350,000 square miles, and includes the kingdoms of Tigré, Amhara, Gajam, and Shoa, besides several outlying dependencies.

Abyssinia is a vast plateau intersected by deeply running rivers, whose beds have been worn to considerable depth. In this way island-shaped masses of land have been formed called 'ambas.' A feature of these ambas is their almost perpendicular ascent, a characteristic which marks almost the whole of the plateau. The region owes its formation practically to volcanic origin, but, save for a few hot springs, the volcanic action is now extinct. The highest peaks are found in the Simen and Gojam ranges. As the slope of the country is least steep towards the W., the majority of the rivers empty themselves in the Nile. Many, however, of lesser significance, lose themselves in the sand. The Hawash is the chief river. It rises in Shoa and flows into Lake Aussa, where further trace of it disappears. This remarkable phenomenon is partly explained by the great depth below sea-level of the lake. Compared with smaller and neighboring lakes the Aussa is almost fresh, while salt is present in the others to such a degree that it deposits a crust round the edges. The R. Abai, which forms the Upper Blue Nile, reaches that river through Lake Tzana. The Takazze joins the Nile, changing its name, on nearing the confluence, to that of Atbara. The Moreb flows into Nubia, but disappears later in the sand. Of all the physical features of Abyssinia the Lake Tzana is the most arresting. It is 60 m. long and presents a most striking picture.

Generally speaking, the climate of Abyssinia is temperate and fairly salubrious, owing to the practically uniform elevation, though in some parts a very wide range of temperature is covered during the day. The weather conditions may be divided into three periods: the cold season, from Oct. to Feb.; the hot, dry season till June, and the rainy season for the rest of the year. Rain is an important factor in Abyssinia, as the Nile depends for its flood entirely upon its Abyssinian tribes. The climate is conducive to the luxuriant growth of the following trees: date-palm, mimosa, giant sycamore, gum (in many varieties), pine, fig, orange, pomegranate, peach,

apricot, and banana. Among the smaller plants, cotton, indigo, and the sugarcane grow in profusion. In the Kaffa country coffee is indigenous, and is believed to take its name from that region. The staple food of the community is to a large extent dependent upon a regular supply of honey, a fact which gives bee cultivation much impetus.

The political divisions of Abyssinia are composed of provs. and dependent states. The former contain Tigré in the N.E., Amhara in the centre, Gojam, enclosed in a great sweep of the Abai, and Shoa, on the E. of the Abai. The dependent states are many, among which may be numbered the Wallega region, the provs. of Harra, Kaffa, and Gallaland, and Central Somaliland. The only large town of Abyssinia is Harra, of Arab origin. Periods of incessant warfare, and the frequent exhaustion of natural productions, account for the non-existence of large towns. The capital of Abyssinia is Addis-Ababa, in Shoa; other towns are Adowa, Addigrat, Macalle, and Antah, in Tigré; Magdala, Debra-Tabor, Amba-Mariam, and Sokota (at the confluence of all the great trade routes), in Amhara; Aliu-Amber, Debra-Derhan, in Shoa; Leika in Gallaland, and Bongor in Kaffa. Most of the transport of Abyssinia is carried on by means of pack animals, so few of the roads are fit for wheel traffic. There is one railway, however, the Jibriti-Dire, to Dawa, which is 188 m. long. The soil is extremely fertile. In fact Egypt owes all the richness of its own soil to the sediment brought down by Abyssinian rivers. Agriculture is followed on a large scale. Coffee is among the most important productive features of the country. Of mineral resources gold and salt are the most plentiful, silver, coal, and iron existing in small quantities. Nearly all the external export trade of Abyssinia is carried on *via* Aden. Commercially, Abyssinia remained for a long time in a backward state, and not until the twentieth century, under the enlightened and wisely directed energy of Menelik II., was any effort made to advance its interests.

The government of Abyssinia is feudal in its methods of administration. The princes possess powerful influence, and form a council in an occasional meeting called by the emperor. The inhabitants are mainly Abyssinians, and the Galla and Somali tribes. The population is estimated at 4,600,000. In character the Abyssinians are indolent, easily appeased when offended, vain, and selfish. Morally they are lax, and marriage laws are lightly regarded. Indeed polygamy is a common practice. Their religion consists of a less enlightened Christianity, and Mohammedanism.

In early times Abyssinia, or more

correctly Ethiopia, was closely connected with Egypt. Legends trace their origin so far back as a descent from the tribe under the Queen of Sheba, their ruler. The kingdom was subjected to the sway of the Hebrews and the Greeks successively. Christianity was introduced about A.D. 330. The actual history begins with the kingdom of Axum. Relations with the civilized world were severed after a Mohammedan conquest of the country in the middle of the seventh century. In A.D. 1000 a general massacre was carried out by Princess Judith of all the royal family. The infant king, however, was safely conveyed to Shoa. Here he was welcomed, while the rest of the country was ruled by Judith. In 1268 the country was regained by the royal house, the reigning monarch being Tekuno Amtak. Portuguese attention was directed to Abyssinia in the fifteenth century. A settlement resulted, and lasted six years, the royal family accepting the Romish Church. In 1634 a rising against Roman dominance resulted in the resignation of the negus (king) in favor of his son. A state of general confusion followed, no emperor being recognized. In 1769 Michel Sohul, the king of Tigré, installed himself as Ras (Prime Minister) over Abyssinia, after assassinating Joas, the reigning monarch. A Galla chief soon overthrew him and assumed the position of sovereign, a dignity which eventually reached his grandson, Ras Ali. In 1850 a native of Amhara named Kassa, afterwards Theodore, defeated the Ras, and, marrying his daughter, proclaimed himself governor. Three years later he conquered all opposition and installed himself as Negus of Abyssinia. He received assistance in governing from two Englishmen, who were killed in a rising in 1860. His rule now developed a tyrannical character, and so severe became his administration that a general rebellion spread all over the country. It was put down with merciless cruelty. Failure to secure European aid aroused a violent antipathy to Europeans, and British and foreign envoys and missionaries were imprisoned. Peaceful overtures to obtain their release proved futile, and an expedition under Napier landed in 1868. The ill-success of Theodore compelled him to treat for peace. He refused personally to surrender, and committed suicide within the fort he had failed to defend. No sooner had the British left, than renewed strife broke out among the various chiefs for the crown. Prince Kassa of Tigré was successful in proclaiming himself emperor, though he failed to control insubordination among the various states. Meanwhile the Egyptians had become his enemies. An

engagement resulted in such terrific slaughter that the parties mutually retired, and till 1882, when Sudan was abandoned by the Egyptians, the difficulties of demarkation proved very troublesome. The Italians in 1885 occupied Massowah, and afterwards established friendly relations. Four years later Negus John II. died, and Menelik of Shoa became emperor. In a treaty Italy assumed control of Abyssinian affairs, the empire becoming an Italian protectorate. In 1895 a rising under Menelik resulted in Abyssinian independence. Following the ratification of the treaty, European missions were dispatched and an agreement was concluded with the British. With the exception of Somaliland, however, the question of frontier was judiciously avoided. In 1899 a rebellion under Mahomed Abdullah (the 'Mad Mullah') caused co-operation with the British, and although little practical help was rendered, the significance cannot be disregarded of the readiness of Abyssinia to accept and request British aid. In 1906 an Anglo-French-Italian alliance agreed to protect their individual interests and territories in the event of further disturbance. See MAP AFRICA.

King Menelik died in December, 1913, and was succeeded by his grandson, Lij Wassu, who was deposed in 1916, and a daughter of Menelik, Zauditu was chosen ruler. During the World War troops from Abyssinia were allied with the British in the East African campaign. The post and railways of Abyssinia were built by the French. A railway 495 miles long has been constructed from Jibuti to the capital.

ACACIA, genus of shrubs and trees of the sub-family *Mimoseae*, comprising about 450, chiefly Australian and Polynesian species, having compound pinnate leaves or flattened leaf-stalks (*phyllodes*) and clusters of small flowers. Some species produce gum-arabic, catechu, wattle-bark, and valuable timber.

ACADEMY, a gymnastium near Athens—named after Academus, presented to the Athenians by Cimon—where Plato taught for some fifty years up to the time of his death (348 B. C.). Its system of teaching was continued by other philosophers, its various periods being known as the 'old,' 'middle' and 'new' academies.

The name Academy is given in modern times to seats of learning, societies devoted to the advancement of literature, the sciences, art, music, etc.; also to high-class schools, and to riding, dancing, fencing schools and the like. The most famous of modern Académie Française, founded in 1635 by Cardinal Richelieu, the immediate object of which was to

ACADEMY, FRENCH

set a standard of taste in language and literature, to produce a great national dictionary, and to prepare treatises in poetry and rhetoric. The number of members was fixed at forty. The Fr. Academy still remains one of the most flourishing institutions of its kind, and has numbered amongst its members some of the greatest names in Fr. literature. By a system of prizes the Fr. Academy encourages literature and learning in France; and it has exercised no small control over the Fr. language and Fr. style. Together with four other academies it now forms the *Institute de France*. These are the *Académie des Inscriptions et Belles Lettres* (founded by Louis xiv. in 1663); the *Académie des Beaux Arts* (1648); and the *Académie des Sciences Morales et Politiques*. The word 'académie' also applies to each of the seventeen univ. divisions in France.

In 1902 was founded the Brit. Academy for the Promotion of Historical, Philosophical, and Philological Studies. Other Academies are the Royal Academy of Arts (see below), the Royal Scot. Academy and the Royal Academy of Music, founded 1822. The most notable Amer. academies are the National Academy of Design (New York), the Amer. Academy of Arts and Sciences (Boston), the Academy of Natural Sciences (Philadelphia), the Peabody Academy of Sciences (Salem, Mass.), and many others. In Germany the *Académie der Wissenschaften* was established in 1700; and most continental countries have one or more academies of kindred type. The International Association of Academies was founded in 1899, on the initiative of the Royal Society, and represents a score of European and Amer. academies and learned societies.

ACADEMY, FRENCH. See **ACADEMY.**

ACADEMY (ROYAL) OF ARTS (London). When George III. came to the throne of Great Britain in 1760 he commenced to encourage the cultivation of the arts. Attempts had previously been made by the prin. artists to form a permanent A. for the cultivation of painting, sculpture, and architecture, but they had failed. In 1760, however—with the assistance of 'The Society for the encouragement of Arts, Manufactures, and Commerce, in Great Britain,' which was established in 1754—the artists opened the first public exhibition which attracted public attention. Its first quarters were in Somerset House, but when old Somerset House was purchased by the nation a part of the new building was given to the society. In 1836 it was removed to Trafalgar

ACADEMY OF ARTS

Square, and it was afterwards removed to Burlington House, Piccadilly, its present quarters. It consists of forty academicians, painters, sculptors, and architects; thirty associates; and several honorary members.

ACADEMY OF ARTS AND LETTERS, AMERICAN, an American society for the advancement of the Fine Arts and Science, founded at a meeting of the American Social Science Association in 1898. The first members of the society were selected by ballot from the National Institute of Arts and Letters from its own membership and were seven in number. Those elected in 1904 were William Dean Howells, Augustus Saint-Gaudens, Edmund Clarence Stedman, John La Farge, Samuel L. Clemens, John Hay and Edward McDowell. The qualification for membership as stated by its constitution shall be 'persons of notable achievement in art, music and literature'. In order to become a member one must first have been elected to the National Institute of Arts and Science. The Society is limited to fifty members. Since 1918 the following have been elected to fill vacancies: Paul Shorey, Charles Adams Platt, Maurice Francis Egan, Archer M. Huntington, Childe Hassam, David Jayne Hill, Lorado Taft, Booth Tarkington, Henry Bacon, Charles Dana Gibson, and Joseph Pennell. The following are the members in 1923: John Singer Sargent, Daniel Chester French, James Forbes Rhodes, William Milligan Sloane, Robert Underwood Johnson, George Washington Cable, Henry van Dyke, William Crary Brownell, Basil Lanneau Gildersleeve, Woodrow Wilson, Arthur Twining Hadley, Henry Cabot Lodge, Edwin Howland Blashfield, Thomas Hastings, Brander Matthews, George Edward Woodberry, George Whitefield Chadwick, George de Forest Brush, William Rutherford Mead, Bliss Perry, Abbott Lawrence Lowell, Nicholas Murray Butler, Paul Wayland Bartlett, Owen Wister, Herbert Adams, Augustus Thomas, Timothy Cole, Cass Gilbert, William Roscoe Thayer, Robert Grant, Fredrick MacMonnies, William Gillette, Paul Elmer More, Garl Melchers, Elihu Root, Brand Whitlock, Hamlin Garland, Paul Shorey, Charles Adams Platt, Maurice Francis Egan, Archer M. Huntington, Childe Hassam, David Jayne Hill, Lorado Taft, Booth Tarkington, Henry Bacon, Charles Dana Gibson, Joseph Pennell. The Directors of the Academy are N. M. Butler, Hamlin Garland, Cass Gilbert, Thomas Hastings, A. M. Huntington. R. U. Johnson, Brander Matthews, W. M. Sloane, and Augustus Thomas.

In 1923 the Academy moved into its new building on 155th Street, New York City, the corner stone of which was laid by Marshal Foch.

ACADEMY OF DESIGN, NATIONAL, an American art institution founded in 1825 in New York City, N. Y. The National Academy of Design and the Society of American Artists (founded in 1877) were combined on April 7, 1906. All members of the latter society were absorbed by the parent society. The Society conducts schools for the various branches of art, holds yearly exhibitions and awards prizes and scholarships.

The membership is divided into two classes: National Academicians who sign themselves N. A., and Associate Academicians who sign A. N. A. The Academy is ruled by a Board of Council which consists of the following officers: President, Edwin H. Blashfield; Harry W. Watrous, Vice President; Charles C. Curran, Corresponding Secretary; Douglas Vold, Recording Secretary; Francis C. Jones, Treasurer; W. Granville-Smith, Robert I. Aitken, Henry Adams, Emil Carlsen, Charles A. Platt, and Hobart Nichols. The Academicians numbered in 1923; painters, 105; sculptors, 20; architects, 6; engravers and etchers, 2; while the Associates were about the same in number.

ACADEMY OF NATURAL SCIENCES, of Philadelphia, Pa. This is one of the oldest institutions in America, having been founded in 1812. It contains one of the most complete and valuable collections of natural history specimens in the world. It is especially rich in its collection of birds and also in its very extensive scientific library. Its publications are standards in their fields and include Journals published since 1817, and Proceedings published since 1841.

ACADEMY OF POLITICAL AND SOCIAL SCIENCE, AMERICAN, organized in Philadelphia, Pa. in 1891. The membership is large and it publishes a semi-monthly '*Annals*.'

ACADEMY OF SCIENCE, NATIONAL, an American scientific society, a group of distinguished American scientists. Their object is to report upon progress in research in every phase of science and art.

The society was incorporated March 3, 1863, by Congress and has intimate relations with the United States Government, as every department of the government has use of their reports and investigations. They also make special researches upon demand of any of these departments. The members numbered

in 1923, 186 and are geographically distributed over the whole United States, although this is not considered strictly in their election. The Society is rich in trust funds, the incomes of which go to research work and award of medals. The will of Dallas Bache, first President of the Society, directed that the residue of his estate after death of wife should go to the Society. A recent gift of the Carnegie Corporation gave the Society \$5,000,000 to be expended in a suitable building and balance to be used as a permanent endowment. The officers in 1923 were Charles D. Wolcott, President; Albert A. Michelson, Vice President; A. G. Abbot, Home Secretary; Robert A. Millikan, Foreign Secretary, and Frederick L. Ransome, Treasurer. The office of the Home Secretary is at the Smithsonian Institution, Washington, D. C.

ACADIA, name first applied to all Fr. possessions S. of St. Lawrence, later to New Brunswick, Nova Scotia, and part of Maine. Cap., Port Royal (Annapolis); part of region (Nova Scotia) claimed by English (1631), ceded to France (1667-1713); 18,000 of Acadian population, hostile to Brit. Government, expatriated (1775; see, for poetic account, Longfellow's *Evangeline*).

ACANTHACE (Gk.); an order of dicotyledonous, monopetalous plants, allied to the Labiatae and Scrophulariaceae. The plants are herbaceous or small shrubs, with a gamopetalous corolla in five divs., a convex receptacle bifid ovary, leaves without stipules, brilliant flowers nearly always solitary in the axil of a leaf or a bract. Many of the plants have medicinal properties.

ACANTHUS, genus of Mediterranean and Asiatic plants with prickly leaves, which have served as a model for architectural ornamentation, (e.g.), on Corinthian capitals.

ACAPULCO, the most important seaport on the Pacific coast of Mexico, 180 m. from the cap. The harbor is deep and capable of containing 500 ships, but the climate is unhealthy and the tn. subject to frequent earthquakes. That of 1909 practically destroyed the tn. Exports chiefly consist of hides and fruit. Pop. 6000.

ACARINA, ACARIDA (zool.); order of Arachnida including mites and ticks.

ACCELERATION, rate of increase or decrease of the velocity of a body; a. of gravity, the increase in the velocity of a freely falling body, being 980.6 centimeters per second at sea-level in Lat. 45°.

ACCENT (1), stress or emphasis put upon one syllable of a word, (*e.g.*) emphasis. In long words a second subordinate a. may occur. In Eng. language, a. tends towards initial syllables. A. sometimes distinguishes nouns from verbs, (*e.g.*) *con'vert* (noun), *convert'* (verb). In prosody (*q.v.*) a. plays leading part. (2) Stress on certain notes in music, generally 1st and 3rd notes in bar. (3) Grammatical sign to indicate different kinds of pitch or vowel sound. The *acute* a. 'marks a stressed syllable, a raised tone or a 'closed e' in French: the *grave* 'denotes a lowered pitch, or an 'open e' in French; the *circumflex* a. is a compound of the acute and grave, and in Fr. signifies a prolonged vowel. (4) Peculiar pronunciation or intonation (*e.g.*), Glasgow a., French a.

ACCEPTANCE, legal instrument by which a person agrees to the terms of a bill of exchange.

ACCESSORY, accomplice in a crime, but not present at its commission; 'accessory before the fact,' instigator of a felony; 'accessory after the fact,' one who shelters known felon or aids his escape.

ACCIDENT, unforeseen or unexpected misadventure (see EMPLOYERS' LIABILITY ACTS, and INSURANCE); in logic a fortuitous quality of a thing, not inherent in, or necessarily to be inferred from, a generic term.

ACCIDENTAL, an alteration of the pitch of a note by sharp, flat, or natural; effect limited to bar in which it occurs.

ACCOLADE, blow on neck or shoulder with flat of sword in ceremony of conferring knighthood; a brace in music.

ACCORDION, small free reed, wind instrument with keys; like concertina; invented (1829) by Damian, a Vienna maker.

ACCOUNT, detailed statement of transactions between two parties, made for the purpose of determining the financial position of the one to the other. 'Account stated' is an admission that a sum of money is due.

ACCOUNTANT, an expert bookkeeper; one skilled in the preparation of balance-sheets, profit-and-loss accounts, etc.; Auditors of accounts are referred to in the Westminster Statutes in Edward I's reign.

ACCRA, seapt., Gold Coast, Africa (5° 34' N., 0° 12' W.), originated in three forts. Exports rubber, cocoa, ivory; railway to interior. Pop. c. 20,000.

ACCRETION, growth, addition; ex-

tension of land by natural process, (*e.g.*), silting, retreating watermark, and the like.

ACEPHALOUS, headless; (zool.), pertaining to the Acephala (Lamellibranchior bivalve mollusca bot.), having an ovary with a style at the base, instead of at apex.

ACEROSE, needle-shaped, as the leaves of the pine.

ACETANILIDE, ANTIFEBRINE, a febrifuge; consisting of shining plates; M.P. 112° C.; prepared by boiling aniline with glacial acetic acid.

ACETIC ACID (CH₃CO.OH), colorless pungent liquid, B.P. 118°, obtained by the oxidation of alcohol. It congeals at 16.7° (glacial a. a.). Vinegar is impure a. a. The salts are termed acetates; potassium and lead acetate are used in medicine. A by-product in the manufacture of a. a. from wood spirit is *Acetone*, DIMETHYL KETONE (CH₃CO.CH₃), a colorless volatile liquid, B.P. 56.5°, used in the manufacture of chloroform, iodoform, sulphonal, and cordite, and as a solvent, occasionally used in medicine for asthma. Another ketone is *Acetophenone*, PHENYL-METHYL KETONE (C₆H₅CO.CH₃); crystallizes in colorless plates; M.P. 20°, B.P. 202°. It is the simplest aliphatic-aromatic ketone.

ACETO ACETIC ESTER, (CH₃CO.CH₂CO.OCH₃), colorless liquid of pleasant smell, B.P. 181°; of great importance in the preparation of quinolines, pyridines, pyrrols, uric acid, and many other compounds.

ACETONE, dimethyl ketone (CH₃CO.CH₃), a colorless volatile liquid, b.p. 56.5°, obtained among the products of distillation of wood, and also by heating dry calcium acetate; used in the manufacture of chloroform, sulphonal, and as a solvent. Great quantity employed in production of cordite; 150 tons weekly required during World War. The shortage of acetone from usual sources augmented by a supply obtained by fermenting corn with suitable bacteria. It is usually present in the urine of diabetic patients. Unauthorized dealings in it were prohibited. Produced in India from the flowers of *Mowra*.

ACETOPHENONE, phenyl-methyl ketone (C₆H₅CO.CH₃); crystallizes in colorless plates; m.p. 20°, b.p. 202°. It is the simplest aliphatic-aromatic ketone.

ACETYLENE, ETHINE (C₂H₂), colorless, inflammable gas having a faint odor resembling garlic. The pungent smell usually noticeable is due to impurities; liquefies at -82°; solidifies c. -91°. Liquid and solid a. are explosive,

developing a pressure up to 100,000 lb. per sq. inch. Compressed a. and several of its compounds, especially with copper and silver, are explosive. A. polymerises under the influence of heat, and an immense number of organic compounds can be built up from it. It can be prepared by the direct union of carbon and hydrogen under the influence of the electric arc, but it is now universally generated by the action of water on calcium carbide (CaC_2). The latter, a crystalline, semi-metallic, frequently iridescent solid, is manufactured by the fusion of a mixture of ground limestone and anthracite in an electric furnace, carbide works being erected in localities where electricity is cheap owing to the presence of water power, (e.g.), Niagara, Switzerland, Falls of Foyers. Various kinds of a. generators have been designed, the main feature being the method by which the water is brought into contact with the carbide. The safest are those in which carbide is dropped into an excess of water, as the dropping of the latter on to carbide creates a great amount of heat, causing the gas to decompose into compounds which choke the burner. As under low pressure and without a small admixture of air the gas burns with a very sooty flame, and a large amount of air not only produces great heat (utilized in the oxy-acetylene blowpipe), but is highly dangerous, the necessary air for a brilliant flame is obtained from small openings just below the burner tip. It yields 35-45 candle hours per cubic ft. Owing to its many advantages a. is being increasingly used for the lighting of vehicles, streets, and buildings.

ACHÆA, ACHAIA ($38^\circ \text{ N.}, 22^\circ \text{ E.}$), narrow coast region, Peloponnesus; chief town, Patras; produces currants; A. also applied to whole Peloponnesus or Greece.

ACHÆANS, fair-complexioned warrior race, who invaded Greece under Pelops, seized territory of dark-haired Pelasgians, and subsequently became the dominant race. *Achaean League*, ancient Gk. confederation of A. towns; probably first formed for protection against pirates; became important in IV. cent.; took part in wars against Philip and Antipater; dissolved, 283 B.C.; revived, 280, subsequently became chief power in Greece; warred against Rome; finally crushed by Romans, 146 B.C.

ACHÆMENES (Hakhamani), reputed ancestor of ancient Persian royal family (Achæmenides).

ACHÆUS, nephew of Hellen, mythical ancestor of Achæans.

ACHAD, FRANZ CARL (1753-1821), Prussian chemist, applied Marggraf's

discovery of sugar in beet to the foundation of beet-sugar industry.

ACHARD, LOUIS AMÉDÉE EUGÈNE (1814-75), Fr. fiction-writer, was b. at Marseilles. He became a journalist, first in his native tn., then in Paris, and wrote sev. novels of which *La Belle-Rose*, 1847, is the most notable. He also wrote sev. plays.

ACHATES (classical myth.), friend of Æneas; proverbial for fidelity (*fidus A.*).

ACHERNAR, one of the brightest stars in the S. hemisphere, is a *Eridani*, a straggling constellation, known since V. cent. B. C., which extends from near Orion to the boundaries of Cetus and ten down to S. hemisphere.

ACHERON (classical myth.), a river of hell; name of several rivers in Greece suggestive of it.

ACHESON, ALBERT ROBERT (1882), son Robert and Sinclair Acheson. Graduated at Canterbury College, New Zealand University as B. Sc. in 1903 and B. E. in 1906. Employed by New Zealand Government Railroads, 1901-1904. With Westinghouse Air Brake Co. at Addington, N. Z., 1904-1905. With Westinghouse Electric and Manufacturing Co. at Pittsburgh, Pa., 1906-1908. Became professor of mechanical engineering, College of Applied Science; University of Syracuse, 1908. Consulting Engineer for Bureau of Gas and Electricity, City of Syracuse, 1914-1919. General Consulting Engineer, 1919. Contributed to various scientific journals.

ACHESON, EDWARD GOODRICH, (1856), son of William and Sarah Acheson. Educated at Academy at Bellefonte, Pa., given honorary Sc. D. degree by University of Pittsburgh, Pa., in 1909. Became assistant to Thomas A. Edison, 1880, and invented carborundum and a method of making graphite. Awarded Rumford medal in 1908 by American Academy of Arts and Science; Perkin research medal, 1910. Member of various scientific societies; ex-president American Chemical Society. Married Margaret Maher in New York, in 1884.

ACHESON, JOHN CAREY, (1870), son of David and Jennie Carey Acheson. Graduated at Centre College, Danville, Ky., 1898; M. A. in 1900. Given L.L.D. degree by same college in 1913. Became instructor in Greek in Caldwell College, Danville, 1897-1900. Principal Harrodsburg Academy, 1899-1902. President Caldwell College, 1902-1913. President Kentucky College for Women, 1913-1915, and since 1915 President Pennsylvania College for Women. Vice-pres-

dent International Convention Y. M. O. A. Director Western Theological Seminary. Has written and lectured extensively on educational subjects.

ACHILLES, legendary Gk. hero; s. of Peleus and Thetis; his quarrel with Agamemnon forms the chief subject of Homer's *Iliad*. A. is represented as the typical Gk. hero—handsome, brave, compassionate. After slaying Hector, and other Trojan chiefs, he himself fell by the hand of Paris, receiving an arrow in the heel. As a babe A. was dipped by his mother in the Styx and thus rendered invulnerable except in heel by which he was held. A.'s heel is used generally to denote one vulnerable spot.

ACHILLES TENDON, prominent tendon of calf muscles inserted in heel bone. See **ACHILLES**.

ACHIMENES, genus of tropical Amer. herbaceous perennials, cultivated in greenhouses for their beautiful flowers which resemble gloxinias.

ACHIN, ATCHIN OR ATJEH (4° 10' N., 96° 45' E.), district, Sumatra; area, 20,500 sq. miles; principal town, Kota Raja; long remained independent; successfully resisted Portuguese, XVII. cent.; captured by Dutch, 1874; subdued, 1881; again rebelled, 1896; surrendered, 1901; important trading centre from XVII. cent.; exports pepper. Pop. 737,000.

ACHROMATIC, free from color (in optics); applied to lens (q.v.); free from accidentals (in music); antonym of chromatic (q.v.).

ACHROMATIC LENSES. Achromatic in optics is the transmission of colorless light. A single convex lens does not produce an image free from prismatic colors, since rays of different color which make up the white light are not refrangible to an equal degree, and so do not all focus together. Combining a crown glass lens with a lens of concave flint glass, the two being different optical properties the latter will neutralize the former and a clear image is produced. Thus are prepared lenses for telescopes, microscopes, and for other uses, and when so composed are called achromatic lenses.

ACHROMATISM, the property of refracting light without decomposing it into its constituent colors.

ACID, a chemical compound containing hydrogen, which can be replaced by electro-positive elements of radicals (cations), or which, dissociating in aqueous solution, produces hydrogen ions. Most a's contain oxygen, but this is by no means a necessary condi-

tion, as was formerly held by Lavoisier and others. Davy and Dulong were the first to state that hydrogen was the acidifying principle, and Liebig added final proof by showing that a's containing more than one atom of hydrogen (polybasic a.) can either have the entire hydrogen replaced by a metal (cation) to form normal salts, or only partially to form a. salts, or by different metals to form compound salts. Organic a's are compounds containing one or more monovalent CO.OH groups called carboxyl, forming salts when hydrogen is replaced by a metal, and esters when replaced by alkyl radicals. A characteristic quality of a's is to redden vegetable blues like litmus. *Acidimetry*, measurement of the percentage of acid in a solution. If no other substances are present it may be determined by the specific weight; in other cases the usual methods are either by titration or by determining the quantity of an insoluble salt precipitated, or by calculating the amount of carbon dioxide liberated by the addition of a carbonate.

ACIDIMETRY. See **Acid**.

ACKERMAN, CARL WILLIAM, 1890, son of John F. and Mary Alice Ackerman. Educated private schools, Student University of Chicago, 1910. Graduated from Earlham College, Richmond, Ind., 1911. Given B. Litt. by Columbia University School of Journalism, in 1913. Became correspondent of United Press within Central Powers, 1915-1917. Special writer for New York Tribune, 1917. Correspondent for *Saturday Evening Post* in Spain, France, Switzerland, 1917-18. Correspondent *New York Times* with Allied Armies in Siberia 1918-19. Special correspondent for *Philadelphia Public Ledger*. Author, *Germany, the Next Republic*, 1917; *Mexico's Dilemma*, 1918; *Trailing the Bolsheviks*, 1919.

ACKLIN ISLAND (22° 30' N., 74° W.), one of Crooked Island group, S. Bahamas.

ACLAND, RT. HON. SIR ARTHUR HERBERT DYKE (1847), English politician, educationist, and author; represented Rotherham in Parliament (1885-99); vice-president of committee of Council on Education (1892-5).

ACLAND, SIR HENRY WENTWORTH DYKE (1815-1900), Radcliffe librarian, Oxford, for over forty years, and had much to do with the founding of the Oxford University Museum. Pub. at Oxford a memoir on cholera, 1854; *Village Heath*, 1884.

ACNE, skin disease consisting of

inflammation of sebaceous glands, which are plugged by comedones or 'black-heads,' and pimples, which may suppurate; usually affects face, shoulders, and back, and occurs most frequently soon after puberty; believed to be caused by the *a. bacillus*; indigestion and constipation aggravate the disease. Treatment is general hygiene, and application of sulphur ointment; a vaccine of the *a. bacillus* has been prepared.

ACOLYTES (from Gk. to follow) where youths—in holy orders—who assisted and waited on the bishops and priests, performing such offices as lighting the candles, and carrying the bread and wine at communion. These services are now performed by laymen and boys.

ACONCAGUA.—(1) (32° 38' S., 70° W.), Volcanic peak in S. Andes, highest mountain in American continent (23,080 ft.); (2) a province of Chile; chief town, San Felipe; area, 5485 sq. miles. Pop. 1920, 116,914.

ACONITE (*Aconitum*), genus of plants of the buttercup family, with tall stems and blue or yellow flowers, including about 60 species, (e.g.) *A. napellus*, common monkshood, wolfsbane (*A. lycoctonum*), cultivated in gardens. The roots are poisonous, containing aconitine (C₃₄H₄₈O₁₁N) and other alkaloids, used in med. externally as a chloroform liniment to relieve neuralgic pains, and internally in small doses to steady and slow the action of the heart in fevers.

ACORN is the fruit of the *Quercus*, or oak. It is a nut, being a large, dry fruit which does not break open to free the seed and its base is enclosed in a cupule. The A. of *Q. aegilops* is used, when unripe, for tanning.

ACORUS is a genus of plants of the Araceæ, belonging to the Spadicifloræ, which has two species, *A. calamus*, the sweet flag, and *A. gramineus*, a Japanese flower. The sympodial rhizome has a sweet-scented oil, and by its branching reproduces the plant vegetatively.

ACOUSTICS, the science of sound. The acoustic (hearing) qualities of a hall are increased by rough surfaces (draperies, audience), as an empty room confuses the sound owing to echoes.

ACQUI: 1. A province in N. Italy, producing corn, fruit, and wine. 2. The chief tn. of the prov. of Acqui. It contains a fine old cathedral, churches, convents, and other buildings, and is the see of a bishop. Its hot sulphur springs are famous (known to the Romans as Aquæ Statiellæ). Here Napoleon defeated the Austrians, 1796. Pop. 14,000.

ACRE, land measure, originally area ploughed by a yoke of oxen in a day; now legally equal to 160 sq. rods (4840 sq. yds. = 4047 sq. metres).

ACRE (32° 55' N., 35° 5' E.), town, palestine; renamed *Ptolemais* by Ptolemy I. (q.v.); taken by Crusaders and retaken by Saracens in first and third crusades; seized by Turks, 1517; unsuccessfully besieged by Napoleon, 1799; captured by Ibrahim Pasha, 1831; taken by Austrian, Brit. and Turk. allies, 1840. It is connected with Haifa by a railroad 11 miles in length. Pop. c. 12,000.

ACRE, AQUÍRY (11° S., 68° 20' W.), river, Brazil; joins Purus.

ACRO CORINTHUS (Gk. a peak), a steep rock, about 1900 feet high, which is near the city of Corinth, in Greece. It contains the ruins of the acropolis, anct. fortifications, a temple of Aphrodite, and the famous well, Pirene.

ACROGRAPHY, stereotyping from designs traced on chalk surface.

ACROLOGY, the study of alphabetic symbols and initial sounds and syllables.

ACROPHONY, representation of a sound in ancient times by a picture or symbol which in still earlier times was used to signify an object of which that sound is the initial syllable or letter.

ACROPOLIS, fortified height above Gk. city; within walls were temples and public buildings. See **ATHENS**.

ACROSTIC, verse composition in which the initials of the lines form a word, or phrase; used by the Greeks and Latins, and later by Boccaccio. In a double a. the final letters also form words.

ACT, a deed performed; division or a play; in law, a written instrument completing a transaction; also, *act of God*, an unforeseen unpreventable occurrence; *act of grace*, granting of a privilege.

ACTÆON (classical myth.), hunter, who surprised Diana whilst bathing, and was changed into stag.

ACTINIC RAYS, rays in the blue, violet, and ultra-violet, part of the spectrum which are strongly chemically active.

ACTINISM, property of solar rays by which chemical changes are effected, (e.g.), in photoplay—*Actinology*, science dealing with this property.

ACTINIUM, a radioactive element, discovered by Deblerna.

ACTINOLITE, a variety of amphibole, a compound of magnesium, silica

and calcium, a mineral nearly allied to horne blende. Its affinity and composition are shown by its compound name of magnesia lime-iron. In color it is a bright green, or lighter green, the green color being given it by its iron contents.

ACTINOMYCOSIS (STREPTOT-RICHOSIS), chronic infectious disease of cattle and of men caused by the *streptothrix actinomyces* and allied organisms. The region of the mouth and jaw is the commonest site of a.; in animals there are tumor-like masses of granulation tissue; and in man there is usually swelling and chronic suppuration; it may spread to the lungs, brain, and other internal organs. Treatment is to remove affected tissues by operation; X-rays and potassium iodide are used where this is impossible.

ACT OF SETTLEMENT. An A. passed by a Tory gov. in 1701 in the reign of William III. which had for its object 'The further limitation of the crown, and better securing the right and liberties of the subject.' It was of great importance in settling the modern constitution of the country and arose out of the need for securing the Protestant succession to the throne. King William and his consort, Mary, were childless, as was also Anne the heir-presumptive the elder branch of the Stuarts were dead or Roman Catholics so the succession was settled on the Electress Sophia of Hanover, a granddaughter of James I., and her heirs, 'being Protestants.' Her son became George I. In addition to arranging for the succession by a series of eight important articles, the power of the throne was restricted and certain abuses guarded against. Perhaps the two most important were those relating to the appointment of judges (making them practically irremovable), and asserting the right of parliament alone to declare war.

ACTA SANCTORUM ('Acts of the Saints') is the title of a series of volumes, begun in 1643 and still going on, devoted to recording the lives of the saints and martyrs of both branches of the Catholic Church. The work was projected by a Flemish Jesuit, Heribert Rosweyde, in 1607, but it was not till 1643 that John van Bolland pub. the first volumes. Other members of the Jesuit order who aided or continued the work were named Bollandists after their leader. More than 60 vols. have already appeared, dealing with the saints in the calendar from Jan. to Nov., and the Bollandists receive an annual grant of 6000 fr. from the Belgian gov.

ACTÆA (from Gk.), by which was

designated the medicinal plant *Sambucus ebulus*, the dwarf elder. Linnaeus transferred the name to some plants belonging to the Ranunculaceæ, which are found in America, Europe, and the N. of Asia. *A. scicata*, the bane-berry or Herb-Christopher, well known in England, has a poisonous purplish-black fruit.

ACTINOZOA, in zoology, a class of the Coelentera, animals of a low type of organization, distinguished by conspicuous radial symmetry. They are divided into two sub-classes. Zoantharia and Alcyonaria, the former including sea-anemones, stony corals, and black corals, and the latter the precious red coral, sea-fans, and sea-pens.

The class is sometimes known as *Anthrozoa*.

ACTIUM, now Akri, tn. and promontory at the entrance of the Ambracian Gulf on the W. coast of Greece. It is celebrated as the scene of the final overthrow of Antony and Cleopatra by Augustus, on Sept. 2, 31 B. C. Apollo, from his temple on the promontory, received the title of Actius or Actiacus. For description of battle see Dion Cassius, bk. i.

ACTON, JOHN EMERICH, 1ST BARON (1834-1902), Eng. historian; a zealous Roman Catholic; opposed doctrine of Papal Infallibility in 1870, but did not secede from Catholic Church; raised to peerage (1869); app. prof. of Modern History at Cambridge (1895); literary output small, but work all marked by deep scholarship.

ACTS OF THE APOSTLES, a unique book in the New Testament giving the history of the Church from the Ascension of Christ till the imprisonment of St. Paul in Rome. The A. is traditionally the work of St. Luke, being the continuation of his Gospel. External evidence for this is strong, and there is no contrary tradition. Much controversy has arisen over the so-called 'we' passages. Many critics have thought that these might be by St. Luke and were incorporated with the A. by the author (whoever he was). Recent investigation by Harnack and others makes it probable that all the book is by St. Luke. As regards the 'we' passages, the change from 3rd to 1st person may be due either to incorporation of his own diary or to vivid recollection of personal experience. The earlier part is concerned with the work of the Apostles as a whole, the later with St. Paul. It is probable that the historicity of the work is greater in the later part than in the earlier, for which the author may have been dependent on

oral tradition. The speeches, like those of other ancient authors, can hardly claim to be the actual words spoken. There is also an important textual problem: possibly the author himself issued a second edition. The date must be before the end of the 1. cent., Harnack now thinks before 70 A. D. Recent investigation tends on the whole to support its historicity.

ACTUARY, originally registrar or clerk; now official calculator to insurance company. Actuarial work has now become a science, and the a. can, when furnished with the proper statistics with regard to any person, assess with sufficient accuracy the chances of his living a given time. The material for such a decision is provided by statistics of the general population, which are now reduced mathematically. The security of Insurance work, hence, depends upon as large a selection as possible of the general population being included among its clients. The a. errs, however, on the side of security.

ADA, Oklahoma, a city and county seat of Pontotoc co. It is connected by the St. Louis and San Francisco Railroad; the Oklahoma Central; and the Missouri, Kansas and Texas railroads. It has fine roads and drives and is the seat of the State Normal School. Several large industries are located here including the manufacturers of cement and asphalt. Much cotton is grown in the surrounding country. It is also a center of agricultural products and is a mineral producing country. Pop. 1920, 8,012

ADAGIO, musical term indicating slow time; also slow movement in a composition.

ADALIA (36° 53' N., 30° 46' E.), port, Asia Minor, at head of gulf of A.; founded by Attalus II. (*Attalia*); *SATTALIA* of Crusaders; exports grain, cattle, and horses; coast trade. Pop. 25,000.

ADALBERT, ST. (c. 939-997), b. of a noble Bohemian family, was created bishop of Prague in 982. He preached Christianity to the Hungarians, then to the Prussians and Poles, and was murdered by an unbelieving Prussian priest. He is called the 'Apostle of Prussia,' and his feast is celebrated on April 23. His bones were reinterred in Prague Cathedral in 1880.

ADAM, the first man according to *Genesis*. The derivation of the name is obscure, probably from a root also found in Assyrian 'to make, produce,' possibly from another 'to be red,' but A. means in Hebrew also 'man, mankind' in general.

The more primitive account of the creation of man is in chap. II. 4b-8; that in I-II. 4a (the Priestly Code) is later. Some think that originally the narrative was merely mythological and has been 'toned down' by the editor. The creation of man in 'the image of God' and some later traditions seem to show that the position of A. was exalted. Several Babylonian legends offer some, but none a very complete parallel to the story of A.; according to one, a hero Etana is cast down from heaven, which suggests the Fall. There are not many references to A. in the other books of the Old Testament, and the conception of original sin as resulting from the Fall is hardly found. Various legends about him are found in later Jewish lit., and works exist bearing his name in Ethiopic and Armenian.

ADAM, JULIETTE, NEE LAMBER (1836), Fr. novelist and miscellaneous writer.

ADAM, PAUL (1862-1920), a French writer of fiction and a dramatist of much merit who has contributed largely to later period of French literature. He was also a figure in French politics. His first works began to appear about 1885 and show the influence of Zola more so than his later writings. His better known works include the *Red Robes*, 1891; the *Child of Austerlitz*, 1902; the *Sun of July*, 1903; and *Stephani*, which appeared in 1913. He also gave to the public several plays and collaborated in many others. His '*Unknown City*' passed through ten editions in 1911.

ADAMANT, figurative term applied to something extremely hard; a diamond, loadstone, or emery stone.

ADAMI, JOHN GEORGE (1862), son of John George and Ann Ellis Adami. Educated at Owens College, Manchester; Christ's College, Cambridge, also at Breslau and Paris. Became House Physician Manchester Royal Infirmary and demonstrator of Pathology University of Cambridge, 1887. Fellow of Jesus College, 1891. President Association of American Physicians in 1911-1912. Went to McGill University as Strathcona Professor of Pathology and Bacteriology in 1892 and served there until 1919. Became Honorable Fellow of Christ's College and Jesus College, Cambridge, in 1920. Contributed numerous papers upon pathological subjects to English and American medical journals. Author of *Principles of Pathology*, 1908; *Medical Contributions to the Study of Evolution*, 1918. Married 1st, Mary Stuart (died 1916), and 2nd, in 1922, Marie Wilkinson.

ADAMS, Massachusetts, a city of

ADAMS, BROOKS

Berkshire co., about 15 miles north of Pittsfield and is located upon the Hoosick River. Its railroad is the Boston and Albany; within the town limits is Mount Greylock, the highest point of elevation within Massachusetts. It has good schools and a public library. The city contains a monument to President McKinley, and numerous churches, including a Quaker meeting house. The manufactures of the city are principally cotton and woolen mills. Paper and lime are also made. Pop. 1920, 12,967.

ADAMS, BROOKS (1848,) son of Charles Francis and Abigail Brown Adams. Graduated from Harvard University, 1870. Became Secretary to his father at Geneva where the latter was acting arbitrator upon Alabama Claims Commission under the Treaty of Washington. Admitted to bar in 1873. Lecturer Boston University, School of Law, 1904-1911. Author of *The Emancipation of Massachusetts*, 1887; *The Law of Civilization and Decay*, 1896; *America's Economic Supremacy*, 1900; *The Theory of Social Revolutions*, 1913. Also many articles in legal and other magazines.

ADAMS, CHARLES FRANCIS (1807-1886), American diplomatist, son of John Quincy A. (q.v.), b. at Boston, Massachusetts. Studied diplomacy under his father at an early age in Russia and England, and returning to Harvard graduated in 1825. Studied law, and sat in the Massachusetts House of Representatives and Senate. Sat as a Republican in Congress; was appointed minister to Great Britain in 1862. He opposed the sailing of the *Alabama*, and succeeded in influencing Lord John Russell in stopping the *Alexandra* and two ironclads intended for the Confederate states. He left England in 1868 and sat at the Geneva Conference (1871-2). He edited the works of John Adams (1850-6) and the memoirs of John Quincy Adams (1874-7). See *Life* by his son, O. F. Adams, Jr., 1900.

ADAMS, CHARLES FRANCIS (1866), son of John Quincy and Fanny Adams; great great grandson of John Adams second president of the United States. Graduated from Harvard University in 1888. Admitted to the bar in 1893. Practised law with Sigourney Butler and later with Judge Everett C. Bumpus. Trustee of Boston Ground Rent Trust Co.; Boston Real Estate Trust; Massachusetts Gas Co.; director of Old Colony Road Co. Became mayor of Quincy, Mass., in 1896. Elected Treasurer of Corporation of Harvard University in 1898. Has taken interest in amateur sports, notably in yachting; was chosen as amateur skipper for the

ADAMS, GEORGE

yacht *Resolute*, which captured the International Yacht Races of 1920.

ADAMS, CHARLES KENDALL (1835-1902), an American historian whose writing was prolific both in historical interests and upon educational topics. He became president of Cornell University in 1885 and of the American Historical Association in 1890. He went to the University of Wisconsin in 1892 as president, and was the means of rapidly bringing that university to the forefront of American colleges. He found time to edit-in-chief *Johnson's Universal Cyclopedia*, in 1892.

ADAMS, COMFORT AVERY (1868), electrical engineer; b. Cleveland, O. S. B. Case School of Applied Science, Cleveland, 1890 (E. E. 1905), also student in mathematics and physics, Harvard, 1891-3. Assistant in physics, Case School of Applied Science, 1886-90; designing engineer, 1890-1; instructor 1891-6; assistant professor, 1896-1906; professor of electrical engineering, 1906-16. Lawrence professor of engineering at Harvard University, since 1914; dean of Harvard Engineering School, 1919; Consulting electrical engineer for a number of industrial corporations. During the World War served as chairman General Engineering Committee, council of National Defense, also Welding Committee, Emergency Fleet Corporation. Author of *Dynamo Design Schedules*.

ADAMS, FRANKLIN PIERCE (1868), electrical engineer and geographer, b. Napa, Cal. Toured and studied conditions in Mexico, 1900, also Latin America, Spain, Portugal, the Orient and England. Editor *Bulletin of Pan American Union*, Washington, D. C., 1908-19; counsellor *Pan-American Union*, 1920. Fellow Royal Geographical Society (London); member Geographical Societies of Lima, La Paz, Rio de Janeiro and Washington, D. C.

ADAMS, GEORGE BURTON, (1857), university professor; b. Fairfield, Vt. Professor of history at Yale University since 1888. Educated at Beloit College, Yale and Leipzig universities. Editor *American Historical Review*, 1895-1913. Member American Historical Association, etc. Author of *Civilization During the Middle Ages*; *The Growth of the French Nation*; *The Origin of the English Constitution*; *Outline Sketch of English Constitutional History*; *The British Empire*, *Constitutional History of England*.

ADAMS, GEORGE MATTHEW (1878), Saline, Mich. President of Adams Newspaper Service, 1907-16, the George Matthew Adams Service, 1916, New

ADAMS, HENRY

York City. Syndicates Walt Mason's prose poems and other newspaper features. Author of *You Can*, 1913; *Take It*, 1917; *Up*, 1920; *Pepper Talks*.

ADAMS, HENRY (1838-1918), American historian, b. Boston, Mass.; grandson of John Quincy Adams. Edited the *North American Review* and was professor of History at Harvard College. Chiefly known for his *History of the United States from 1801 to 1817*, an authentic record of that period, and for his autobiography, *The Education of Henry Adams*, published in 1918 after being printed for private circulation only.

ADAMS, HENRY CARTER (1851-1921), American editor, b. Davenport, Iowa. Educated at Iowa College, Andover Theological Seminary, Johns Hopkins University, and in Berlin and Paris. Appointed lecturer on political science in Cornell University 1880; professor of political economy and finance University of Michigan, 1887; director of Division of Transportation in Eleventh Census; statistician Interstate Commerce Commission, 1887 to 1911; financial adviser to Chinese Republic, 1913-16. Member of many economic societies. Received honorary degrees from Iowa College, University of Michigan and Johns Hopkins University. Author of *Taxation in the United States*, 1786 to 1816; *Public Debts*; *Description of Industry*, and *American Railway Accounting*.

ADAMS, HERBERT (1858), American sculptor, b. Concord, Vt. Pupil at Mercie at Paris. Received awards at Chicago, Paris, St. Louis and San Francisco expositions; medal of honor, Architectural League, 1915; prize, National Academy, 1916. Ex-president, National Academy of Design; member American Academy of Arts and Letters, National Sculpture Society, American Federation of Arts and Architectural League of New York.

ADAMS, JOHN (1735-1826), second president of the United States, was b. at Quincy, Norfolk co., Massachusetts. Educated at Harvard (1755), he was called to the bar in 1758. He was one of the Mass. representatives to the Congress in 1774, and a promoter of the Declaration of Independence, 1776. He became ambas. to Holland, 1782; to Great Britain, 1785; president of the United States, 1797-1801. He pub. a *Defense of the Constitution of the U. S.* in 1787. See also UNITED STATES—History.

ADAMS, JOHN QUINCY (1767-1848), 6th president of U.S., and eldest

ADAMS, SAMUEL

son of 2nd president; called to bar (1790); minister to the Hague (1794). While minister at Berlin (1797) was described as ablest of American diplomats. Elected to senate as member for Massachusetts (1803); supported Jefferson in purchase of Louisiana; in 1806 denounced Britain for enforcing her claim to search and confiscate cargoes of neutral vessels; was minister at Petrograd (1809) and at London (1815); recalled to U.S. to become secretary of state (1817); elected president (1825-9).

ADAMS, JOHN WOLCOTT, (1894), Artist, b. Worcester, Mass. Illustrator of books, poems, etc. for *Harper's*, *Scribner's*, *Century* and other magazines, and of James Whitcomb Riley's *Hoosier Romance* (1910); also known for his drawings, illustrating old songs, Colonial incidents, etc.

ADAMS, MAUD, American actress (1872). Daughter of James and Annie Kiskadden. She took her mother's stage name of Adams. Her mother was the leading woman of a stock company located at Salt Lake City, Utah. She early showed talents as a child actress taking many child's parts in the plays produced by her mother's company, but found time to go to school regularly until she was sixteen years of age. The family went East in 1888 where she joined E. H. Sothern's company in New York City and played ingénue roles. She appeared in 'Midnight Bell' and later joined Charles Frohman's stock company. From this company she went with John Drew supporting him for five years. First starred as Lady Babbalanja in the 'Little Minister' in 1897-98. She was now acknowledged as one of America's greater actresses, and from this time on each play she produced only added to her successes. In 1900 came Juliet in Romeo and Juliet; L'Aiglon in 1901; Quality Street in 1902; The Pretty Sister of José in 1903; The Little Minister and Hop o' my Thumb in 1905; Peter Pan, which was to prove her most popular character and unique in many ways appeared in 1906-7. This was followed by What Every Woman Knows, in 1908-9; Joan of Arc in 1909; As You Like It, in 1910 and Chanticleer in 1911. She has not appeared upon the stage in recent seasons.

ADAMS, SAMUEL (1722-1803), an American statesman, was b. at Boston, Massachusetts, U.S.A., and graduated at Harvard College, 1740. He took the popular side in the disturbances caused by the Stamp Act, 1765, and in the same year was made a member of the legislature of Massachusetts. He signed the Declaration of Independence, 1776.

became lieutenant-governor, 1789-94, and governor until 1797, of Massachusetts. He devoted his life to the cause of the independence of America, and wrote political essays. He was called 'the American Cato.'

ADAMS, SAMUEL HOPKINS (1871), author, b. Dunkirk, N. Y. Reporter and special writer, *New York Sun* 1891-1900; managing editor, *McClure's Syndicate*, 1900-1; advertising manager, *McClure, Phillips & Co.*, publishers 1901-2; member of staff *McClure's Magazine*, 1903-5. Author of *The Great American Fraud*, *The Mystery* (with Stewart Edward White), *The Flying Death*, *Average Jones*, *The Secret of Lonesome Cove*, *The Clarion*, *Little Miss Grouch*, *The Unspeakable Perk*, *Our Square and the People in It*, and other novels. Also a frequent contributor to magazines.

ADAMS, WILLIAM TAYLOR (1822-1897), author and editor. Best known by his pseudonym of 'Oliver Optic,' under which name he became a voluminous and highly popular writer of fiction for the younger generation. His writings embraced travel and adventure, notably *Young America Abroad*, and *Starry Flag Series*.

ADCOCK, ARTHUR ST. JOHN (1864), British novelist and journalist, b. London. Studied for the bar, but abandoned law for literature in 1893. A contributor of numerous short stories, serials, essays and much verse to a great variety of periodicals. Acting editor of the *Bookman* (London.)

ADDAMS, JANE (1860), settlement worker. Daughter of John H. and Sarah Addams. Graduated from Rockford College in 1881 and for two years 1883-85, traveled and studied in Europe and with it began the training for her future work. Returning to Philadelphia, she spent the year, 1888, in further outlining her plans. Miss Addams has been honored by several American and European universities, notably given the LL. D. degree by University of Wisconsin, in 1904; the same by Smith College in 1910; and A.M. by Yale, in 1910. In 1889 she opened Hull House in Chicago, Ill.; being aided by the services of Miss Ellen Gates Starr. Hull House is a settlement home and has been the headquarters of Miss Addams since that time. She was appointed Inspector of Streets and Alleys in neighborhood of Hull House in 1890. Became President of National Conference of Charities and Corrections in 1909. Miss Addams is a noted lecturer as well as writer and has spoken upon settlement work and better living conditions from almost every

prominent rostrum in the country. Her writings are extensive and include not only contributions to magazines and the press but the following books: *Democracy and Social Ethics*, 1902; *Newer Ideals of Peace*, 1907; *The Spirit of Youth and the City Streets*, 1910; *Twenty Years at Hull House*, 1910; and *The Long Road of Woman's Memory*, 1916. She has also been most active in all endeavors looking towards world peace and attended the Peace Conventions at The Hague in 1915, Zurich in 1919, and Vienna in 1921. In 1919 she was elected President of the International Congress of Women.

ADDER (Anglo-Saxon *noedre*, an adder), a name applied to several poisonous snakes of the Viperidæ, and to some non-poisonous Colubridæ. *Vipera* (or *Pelias*) *berus* the European A., attains a length of 28 in., and its bite is seldom fatal. Wycliff applies the term to the serpent in the Garden of Eden.

ADDING MACHINES mechanical devices designed to add, quickly and accurately, long series of figures, date back in idea at least to the 17th century, to Blaise Pascal, a Frenchman. The modern machine is much more complicated and flexible than the original conception; approximately one hundred modifications of the machine exist in commercial use today. Most of these are operated by depressing keys somewhat similar to those of a typewriter. These keys are in groups, of nine numbered from 1 to 9, one group for units, one for tens, one for hundreds and so on for as many places as the machine accommodates. In a listing machine, that is one that prints each item as well as adding them, it is necessary in addition to depressing the keys, to pull a lever usually at the right of the machine, or if the machine is electrically operated a button is pushed, which prints the proper figures on a strip of paper. When the listing is finished the total is printed by pressing a totalizing key and operating the lever or button as above. In a non-listing machine the total is read from the figures on the circumference of the wheels described below, which appear through suitable small windows. The mechanism consists of a series of wheels, one for units, one for tens, one for hundreds, etc., corresponding to the number of digits which constitute the capacity of the machine. The circumference of each wheel is divided into ten parts, numbered from 1 to 9 and 0. These wheels are actuated by the keys on the top of the machine, which when depressed cause the corresponding wheel to turn thru one-tenth, two-tenths, three-tenths of a revolution,

depending on whether key 1, 2 or 3 is depressed. When any wheel makes one full revolution, a projecting tooth or pin on it engages the next higher wheel and causes it to make one-tenth of a turn, thus taking care of carrying.

ADDISON, CHRISTOPHER (1869). British statesman, physician by profession, *b.* Hogsthorpe, Lincolnshire, Eng. Member of House of Commons for Hoxton (London), since 1910. Figured prominently in the British cabinet during the World War, and post-war period, when he held the offices of Parliamentary Secretary to the Office of Munitions, Minister of Munitions, Minister in Charge of Reconstruction, President of Local Government Board, Minister without Portfolio, and First Minister of Health. M.D. and B.S. (London). Formerly lecturer on anatomy St. Bartholomew's Hospital (London). Professor of Anatomy, University of Sheffield, and editor of the *Quarterly Medical Journal*. Member of Faculty of Medicine and of other medical bodies affiliated with the University of London. Editor of *Ellis's Demonstrations of Anatomy*, 12th edition; joint author (with Major J. W. Jennings) of *With the Abyssinians in Somaliland*, author of *On The Topographical Anatomy of the Pancreas and Adjoining Viscera*; *On The Topographical Anatomy of the Abdominal Viscera in Man*, etc. Also a contributor of various papers to medical journals.

ADDISON, JOSEPH (1672-1719), essayist, poet, and statesman, was *b.* May 1, 1672, at Milston rectory, near Amesbury, Wiltshire, the son of Lancelot A., who was dean of Lichfield, 1683. He was educated at Amesbury, Lichfield, and Charterhouse, where he was a fellow-pupil with Richard Steele. At the age of fifteen he went to Queen's College, Oxford; but two years later he obtained a scholarship and went to Magdalen College, where he obtained a demyship, 1689, and his M.A. degree, 1693. His facility of reciting Lat. verse first brought him into reputation, and his verses addressed, in 1694, to Dryden procured him the friendship and interest of that distinguished poet. He became acquainted with Lord Somers, and Mr. Montague, afterwards Lord Halifax, and it was through the influence of the former that he obtained, in 1699, a pension of £300 to enable him to travel on the Continent to qualify for diplomatic service. On the death of William III. he lost his pension, and returned to England late in 1703. In 1704, after living for some time in London in a state of poverty, he was appointed by

the gov. to write a poem to celebrate the victory of Blenheim. This poem, entitled *The Campaign*, was so successful that he was appointed a commissioner of appeals, and held sev. appointments, 1704-10. He became under-secretary of state, 1706, accompanied Halifax to Hanover, 1707; and was appointed secretary to Lord Wharton, lord-lieutenant of Ireland, 1708. In 1709 Steele began the *Tatler*, and A. soon became a contributor, taking a leading part in its production. The first number of the *Spectator* appeared in 1711, and was continued until Dec. 1712 by A. and Steele. Then followed the *Guardian*, the first number of which was pub. in March, and the 175th and last in Oct. 1713, of which Steele was the editor, and A. a contributor. In the same year A. brought out his celebrated tragedy of *Cato*, which procured for him still greater fame than any of his former productions had done. In June, 1714, appeared the first number of a continuation of the *Spectator*, to which A. contributed until its termination in Dec. 1714. His prose comedy *The Drummer* was pub. 1715, but it was not a success. He then commenced a periodical publication in support of the gov. under the title of the *Freeholder*. It consisted to two papers a week, and was continued until June 1716. In the same year he married the Dowager Countess of Warwick, and was appointed secretary of state, 1717. He, however, retired from office, 1718, on the ground of ill-health, but really in consequence of his entire inaptitude for debate in parliament and for the ordinary business of his office. His health soon began to fail, his domestic life was not happy, and he died at Holland House, Kensington, June 17, 1719.

As a poet and dramatist, A. formerly held a much higher place than he now does; his greatness lies in the fact that he is one of the most famous of all English essayists. His style is easy, polished, and graceful, and his essays are characterized by a delicate sense of propriety, a lively fancy, and most original and exquisite humor. He was the founder of a new school of popular writing, and his works had the object of raising the manners and standard of life of the people, and of forming a good taste and sound opinion. Although many have attempted to imitate him, and his contributions to the *Tatler*, *Spectator* and *Guardian* are both amusing and instructive, and suited alike to the gay and the serious. In character he was supposed to have been somewhat cool; nevertheless he was kind and magnanimous; and the ease and grace of his manners and conversation made him both popular and admired.

ADDISON, JULIA DE WOLF, (1866), author and art designer, b. Boston. Childhood spent in England. Studied art there as well as in Italy and in Boston on returning to the United States. Married Daniel Dulany Addison, 1889. Works include *Florestane the Troubadour*; *Art of the Pitti Palace*; *Classic Myths in Art*; *Art of the Dresden Gallery*; *Art of the National Gallery*; *Arts and Crafts of the Middle Ages*; *Mrs. John Vernon*; *The Boston Museum of Fine Arts*; *The Spell of England*. Also a playwright and composer of songs. Designer of ecclesiastical ornament, metal work, mosaic, embroideries, etc., and illuminator on vellum, heraldic work and other decorative material. Member, Copley Society and Boston Author's Club. Incorporator of Society of Arts and Crafts.

ADDISON'S DISEASE, usually affects middle-aged males, and is characterized by progressive loss of strength, pigmentation of the skin and patches, and gastro-intestinal disturbances. The disease resembles tuberculosis of the suprarenal capsules (*q.v.*). It is treated with suprarenal extract, rest, tonics, etc., but it invariably ends fatally, sometimes after a prolonged course of several years.

ADE, GEORGE (1866), author and journalist, b. Kentland, Ind. Famous as a satirical humorist, notably in his *Fables in Slang*. Received his training in newspaper work in Lafayette, Ind., 1887-90, and on Chicago Record, 1890-1900. Member of the National Institute of Arts and Letters and a former Trustee of Purdue University. Author, in addition to his *Fables, of Artie*; *Pink Marsh*; *Doc Horne*; *The Girl Proposition*; *People You Knew*; *Breaking into Society*; *True Bills*; *In Pastures New*; *The Slim Princess*; *Knocking the Neighbors*; *Ade's Fables*. Also a successful writer of plays and musical comedies, among them *The Sultan of Sulu*, *Peggy from Paris*, *The County Chairman*, *The Shotgun*, *The College Widow*, *The Bad Samaritan*, *Just Out of College*, etc.

ADEE, ALVEY AUGUSTUS, (1842), Am. public official. b. Astoria, N. Y. Privately educated. Honorary M.A. of Yale University. Entered the diplomatic service in 1870 as secretary of U. S. legation in Madrid; charge d'affaires at various times; later became chief of Diplomatic Bureau and 3rd assistant secretary of state. Acted as secretary of State ad interim in 1898 and during a critical period in the Chinese troubles in 1900. A witness at the signing of the peace protocols between the United States and Spain.

ADELAIDE, the cap. of S. Australia,

on the Torrens, R., 7 m. by rail from Port A. on the Gulf of St. Vincent. It was founded in 1837, and named after the Queen of William IV.; and owing to the discovery of gold soon became an important city. It is situated on a large plain, bounded on the S. and E. by the Mt. Lofty Range, and is divided into two parts, N. and S., by the R. Torrens—the N. part being the residential and the S. part the commercial quarter. There are many public buildings, including the Houses of Parliament, town-hall, post-office, gov. offices, the Anglican Cathedral of St. Peter's, the Roman Catholic Cathedral: It is connected by rail with Sydney, Melbourne, and other important tns.; and is the terminus of the Overland Telegraph from Port Darwin. It is the emporium for S. Australia, exporting through Port A. wool, wheat, flour, and silver and copper ore; has silver and copper smelting works. Pop. with suburbs, 255,000.

ADELAIDE, town and district, Cape Province, S. Africa. Pop. (district) c. 10,000 (2300 white).

ADELAIDE (d. 999), queen of Italy; m. (1) Lothair, s. of Hugh, king of Italy; (2) Otto I. of Germany, who, in her right, laid claim to the kingdom of Italy. A. wielded important influence in Germany, and was crowned in Rome (962) by Pope John XII.

ADELAIDE, QUEEN (1792-1849), consort of William IV.; charitable and virtuous, she greatly purified Eng. Court.

ADELPHI COLLEGE, Brooklyn, N. Y., and institution of higher learning, formerly known as The Adelpia Academy. It was organized in 1896. In 1922 the president was F. D. Blodgett, LL. D. Its faculty then numbered 26 and the student body 460. The college's degree of A.B. has been open for both men and women since 1912.

ADEN (12° 50' N., 45° E.), seaport on Gulf of A., and Brit. territory forming rocky peninsula, Arabia; town fortified; important coaling station; a free port; trading center; captured by Romans, c. 24 B. C., by Turks, 1538; Brit. since 1839, subject to Bombay Government. Pop. 46,200.

ADEN, GULF OF (12° 30' N., 48° E.), between Somaliland and Arabia.

ADENITIS (a gland), a term used in medicine to indicate inflammation of the glands and ganglia, but especially of the lymphatic glands. It may be either acute or chronic; in the former case it generally comes from a skin wound or sore, the glands swell and are extremely

ADENOIDS

painful; in the latter case the cause may be syphilis or tuberculosis, in which the glands swell and symptoms of both diseases are generally found.

ADENOIDS, soft velvety masses, due to overgrowth of the lymphoid tissue, projecting down from the back of the nose and throat; the child affected has usually a stupid, open-mouthed expression, and may be the subject of asthma, deafness, or may micturate involuntarily during the night; nutrition is interfered with, and the child is often backward and languid.

ADERSBACH ROCKS are made of sand-stone and are found in the vicinity of a vil. of the same name in Bohemia, Austria. They are 4 m. in length and of grotesque shapes. The pop. of the village is about 2000.

ADIGE (45° 6' N. 11° 40' E.), river, Italy; enters Adriatic.

ADIPOCERE, a wax-like substance produced by the exposure of fleshy tissue to moisture with the exclusion of air, as in the earth or under water. Human bodies in moist burial-places often undergo this change.

ADIPOSE TISSUE, a collection of fat within the body of an animal. It consists of minute cells containing a secretion of oily matter. A substance is what is known as a connective tissue, that is, it constitutes a sort of packing material between the harder tissues which form the framework of the body. Its uses are to protect the organs from external changes of temp., and to constitute a reservoir of material which may serve as food when other supplies fail.

ADIRONDACK MTS., a very beautiful group in the N. of New York State. They may be regarded as the continuation of the Alleghanies, and they terminate abruptly on the shore of Lake Champlain by sheer cliffs. They stand on a plateau 2000 ft. above sea-level, cover an area of 5000 sq. m., and their highest peak, Mt. Marcy, or Tawahus, has an alt. of 5345 ft. The dist. abounds in lakes and waterfalls, and here are the head-streams of the Hudson. A forest reserve of 4375 sq. m. is owned by the state. A certain amount of lumbering is carried on, but the region is principally noted for being a favorite summer resort.

ADIS, ABABA, ADIS ABEBA (9° 1' N., 38° 56' E.), capital, Abyssinia; founded, 1892. Pop. c. 40,000.

ADJUTANT, military term for officer who assists commander of a corps or regiment, and has charge of correspondence, drill, and discipline.—Adjutant-

ADMIRAL

General, departmental head on army general staff, in charge of discipline, efficiency of troops, etc.

ADJUTANT (*Leptoptilus argala*), large East Indian stork with a bare pouch on the breast, living on carrion and snakes, and, therefore, protected by law in India. See STORKS.

ADLER, CYRUS (1863), college president. An authority on Semitic and Oriental literature and archaeology. Ph. D. of Johns Hopkins University and A.B. and A.M. of University of Pennsylvania. Formerly fellow and instructor in the Semitic languages at Johns Hopkins, librarian and assistant secretary of Smithsonian Institution and curator of historic archaeology and religions of the U. S. National Museum. President, Dropsie College for Hebrew and Cognate Learning, Philadelphia, since 1916. Acted as special commissioner of the Chicago Exposition to Turkey, Egypt, Tunis, Algiers and Morocco, 1890-92. Member American Philosophical Society, American Oriental Society, Washington Academy of Sciences, etc.; chairman Jewish Classics Committee, and of editorial board, New Jewish Translation of the Bible; editor of Jefferson Bible and American Jewish Year Book; associate editor of Jewish Encyclopedia. Notable as a prolific writer on *Semitic Philology, Assyriology, Oriental Archaeology, Comparative Religion, Bibliography and American Jewish History*. Joint author with Allan Ramsay of *Told in the Coffee House*, a book of Turkish Tales.

ADLER, FELIX (1851), lecturer, b. Alzey Germany. A.B. of Columbia and Ph. D. of University of Heidelberg. Professor of political and social ethics Columbia University, since 1902. Founder (1876) of the New York Society for Ethical Culture, and noted for his Sunday discourses there. Formerly professor of Hebrew and Oriental literature at Cornell University. Member of Editorial Board of International Journal of Ethics; chairman, National Child Labor Committee. His writings include *Creed and Deed; The Ethics of the Political Situation* (1884); *The Moral Instruction of Children; Life and Destiny; Marriage and Divorce; Religion of Duty; Essentials of Spirituality; The World Crisis and Its Meaning* (1915); *An Ethical Philosophy of Life*.

ADMETUS (classical myth.), king of Thessaly; one of Argonauts; served by Apollo as shepherd; m. Alcestis (q.v.)

ADMIRAL, name, of Arab. origin, and now applied to highest officers in the navy, thus; Admiral, Vice-A., Rear-

ADMIRALTY GULF

A.; in XVI. and XVII. cent's the name (sometimes spelt 'Ammiral') was used for the ship carrying the chief naval officer; in XVI. cent. France the title was borne by A. de Coligny, who was a military commander.

ADMIRALTY GULF (13° S., 126° E.), large inlet, Kimberley, division W. Australia.

ADMIRALTY ISLAND, a large island of Alaska, about 80 m. long, well wooded; discovered by Admiral George Vancouver about 1793.

ADMIRALTY ISLANDS, in the Pacific Ocean, form part of the Bismarck Archipelago. The largest is about 50 m. long. Discovered by the Dutch in 1616, they came under German protection in 1885. Since 1919 the island has been held by a mandate by Australia.

ADOLESCENCE, period between childhood and maturity; in males from about fourteen to twenty-four years of age; in females, twelve to twenty-one, during which time character is formed and physical development takes place.

ADOLPH OF NASSAU (d. 1298). Ger. king; subsidized by Edward I. of England to attack France but left compact unfulfilled; deposed and killed in battle.

ADOLPHUS, FREDERICK (1710-71). king of Sweden; s. of Christian Augustus, Duke of Schleswig-Holstein-Gottorp.

ADONAI, a Heb. word for the 'Supreme Being.' The singular form is 'Adon,' meaning 'lord,' and the final 'i' is the possessive 'my.' The Jews pronounced 'JHVH' Adonai, and from the consonants 'Jhvh' and the vowels of 'Adonai' the name 'Jehovah' has arisen.

ADONIS, a mythological Gk. hunter, son of Cinyras and Myrrha, beloved of Aphrodite.

ADONIJAH, 4th s. of King David; slain by Solomon.

ADOPTION, act of taking a person into relationship which he or she does not naturally occupy; especially a. of children as sons or daughters; a. was common amongst Greeks and Romans and was subject to strict and well-defined laws.

ADOPTIONISTS, heretics who in VIII. cent. maintained that Christ was the Son of God, not by birth, but by adoption, and as being one with Him in character and will.

ADOWA, ADUA (14° 20' N., 38° 50' E.), town, Abyssinia, trading centre; Italians defeated, 1896, Pop. c. 3000.

ADRIANOPOLE

ADRENALS, an anatomical term applied to a suprarenal capsule or gland (ductless in most vertebrates) near the anterior end of each kidney. In man the adrenal or suprarenal gland is situated at the upper end and is commonly from one to two inches in diameter. Their blood and nerve supply is abundant and their internal secretion appear to have important effects on the circulatory and muscular system, but their functions are imperfectly known. In sheep and oxen the suprarenal or adrenal glands have been found to contain valuable medicinal properties, under the name of adrenalin. The administration of both their substance and extract has at times proved beneficial in treating Addison's disease, but their chief value lies in their powerful local astringent and hæmostatic action.

ADRIA (45° 3' N., 12° 13' E.), town, Italy; in olden times a flourishing seaport; now 14 miles inland owing to silting of river Po; gave name to Adriatic. Pop. 11,300.

ADRIAN, a city of Michigan, the county seat of Lenawee co., situated on the Raisin river, 30 miles northwest of Toledo, O. It is served by the Wabash, the Lake Shore, and the Toledo and Western railroads. An important center of manufacturing plants, and also a market for farm produce and equipment. Seat of Adrian College (Meth. Prot.), the State Industrial Home for Girls, and St. Joseph's Hospital and Academy (Roman Catholic). Pop. 1920, 11,878.

ADRIAN COLLEGE, a co-educational institution of higher education, in the city of Adrian, Mich., in Lenawee co. The governing official in 1923 was H. L. Feeman. The college was founded in 1852 and organized six years later. In 1923 the faculty numbered 16 and the student body 165. The property is valued at about \$250,000 and contains a library of about 10,000 volumes.

ADRIANOPOLE, cap. vilayet of same name, Turkey in Europe (41° 40' N., 26° 33' E.), on l. bk. of Maritza, 198 m. W.N.W. of Constantinople by rail. Important commercial centre in silk, otto of roses, opium, wine, cereals, and tobacco. Mosque of Selim II., bridge Michael, and great bazaar are chief features. Takes its name from Emperor Hadrian, who embellished it 2nd cent. Ottoman cap. (1366-1453); occupied by Russians in 1829; treaty concluding Russo-Turkish War signed here same year. Entered again by Russians in 1878, when armistice concluded. Besieged 155 days during Balkan War (1912-13). Surrendered to Bulgarians,

but recovered by Turkey during second Balkan War. By agreement of the Powers in 1923 it was re-ceded to Turkey. Pop. 85,000.

ADRIATIC SEA, an arm of the Mediterranean Sea, which extends in a northwesterly direction between the east coast of Italy and the west coast of the Balkan peninsula. Its total area is about 52,000 square miles. Into it flows the Po and the Adige rivers. The chief cities are Venice, Brindisi, Trieste and Ancona.

ADRIATIC SEA, OPERATIONS IN. Italy declared war on Austria May 23, 1915; each side strove to keep open Straits of Otranto, at same time denying their use to the enemy; geographical advantage lay with Italians. Minor objects of combatants, small raids on each other's ports and territory, and attempts to prevent military communications along coasts or across sea. Many bombing raids undertaken; arsenal at Venice suffered heavily, but little damage to city. Austrians had bases at Pola and Cattaro; Italians at Taranto, Brindisi, Ancona, and Venice. Brit. drifters established surface barrage in southern channel (1916), and in 1918 between Leuca and the N. of Corfu, thus preventing hostile submarines from entering Mediterranean. No big fleet action; all fighting by cruisers, destroyers, submarines, and light craft. In last eighteen months Italians scored heavily with fast motor boats. Austrians made many barrage raids, and attacked Ital. territory six times in 1915, thrice in 1916, once in 1917, and not at all in 1918.

ADULTERATION OF FOOD. The adulteration of food, in its strictest sense includes only the admixture with it of substances of less value, but the phrase as now used covers the use of preservatives (which, pound for pound, may be very much higher in price than the food in which they are used) and the abstraction from food of the whole or part of its more valuable constituents, as in the case of the removal of cream from milk. In the year 1881, the U. S. Department of Agriculture began an investigation into the nature and extent of food adulteration in this country. The first Food Inspection Law was passed by the State of Massachusetts in 1883, while the national Pure Food and Drug Law was enacted in 1906, at which time twenty-five states had formulated special regulations regarding the purity and labelling of food products. Partly as a result of this legislation there has been a great improvement in the purity of foods of American origin during the last thirty years. Moreover, the manufacturer

has found that there is more money to be made out of pure foods honestly labelled than out of adulterated products. As a result, adulteration is now the exception rather than the rule. Probably less than five per cent of food products, bought at random, would now be found to be adulterated, and adulteration which is injurious to health is very unusual.

The most common adulterations existing today are the admixture of chicory with ground coffee, or of various 'fillers' with spices, the adulteration of butter with cocoanut or other oils, the dilution of milk with water and the extraction of the whole or part of the cream from milk. Among the fillers used in spices may be mentioned ground peanut and cocoanut shells in pepper and turmeric in mustard. The use of chicory in coffee was formerly very common and still occurs to a considerable extent. In fact, it is even claimed that chicory improves the flavor of the coffee, but its chief purpose is to produce a fictitious strength. Flour has been mixed with mineral matter and even sawdust, sirups and honey are adulterated with glucose, and jellies are mixed with gelatin glucose and fruits of lower price than those named on the label. Olive oil was formerly mixed with cotton seed or sesame oil to a large extent, and the practice is by no means unknown today. All these adulterations can be readily detected by chemical analysis or microscopical examination. Over the use of preservatives, a bitter fight has been waged. It is claimed, on one side, that the quantities used are so small that they cannot have any adverse effect on those consuming the food in which they are used. On the other side, the argument is put forward that if preservatives are permitted in one food product, they must be permitted in all, and while the percentage in each product might be small, the sum total in all the foods eaten during a day might be appreciable. The opinion which now finds most favor is that pure foods, properly prepared and packed, need no preservatives to prevent them from decomposing.

ADULTERY, illicit sexual intercourse of married person with another than his or her spouse; the Eng. law is that wife's a. constitutes ground for divorce (*q.v.*), but in the husband's case it must be shown to have been bigamous or incestuous, or be otherwise complicated by cruelty, or two years' desertion.

AD VALOREM (Lat. 'according to value'), duty levied by custom authorities on goods at their estimated value; opposed to specific duty which is according to the weight or size of goods.

ADVANCEMENT OF SCIENCE. Association for the, an international association for world progress in science. The American branch of this association was founded in 1847 and the International Association in 1889, holding its first meeting at Paris, in 1890. The Society meets annually in various cities of the United States, where addresses, reports and papers are made and presented in every field of science. The Association includes eleven sections, each of which holds a separate convention from time to time, and also at the annual meeting of the Association. The sections embrace physics, chemistry, astronomy, mathematics, mechanical science, and engineering, geology, anthropology, geography, botany, zoology, psychology, social and economic science, physiology, experimental medicine, education and kindred subjects. Important work has been done in encouraging scientific research the world over and in promoting interest in its results. A Pacific Coast Division exists separately and holds meetings yearly. The Association publishes an official journal called 'Science' which is published weekly. Through this source the Association brings before the public the latest developments and general scientific data gathered by its various sub-sections. The membership is roughly estimated at about 16,000, distributed throughout the United States and her possessions. The Secretary is Dr. E. E. Livingston, Smithsonian Institute Buildings, Washington, D. C.

ADVENT. solemn season of preparation for the Christmas festival, which has been observed by the Western Churches since VI. cent.

ADVENTISTS. American religious sects, followers of William Miller (1781-1849), who look to near future for the Second Coming of Christ. The millennium was expected in 1843. An offshoot, the 'seventh-day adventists,' fix no particular time for the Second Coming, observe Saturday as the Sabbath, and abstain from alcohol, tobacco, pork, tea and coffee.

ADVERTISING. The gigantic proportions to which the periodical press has grown in the United States bear eloquent witness to the extension of advertising no less than it does to the spread of national education. One is linked with the other. In no other country has advertising reached such a level and volume, or has exercised a greater instructive influence. It has developed an art, a field of knowledge covering everything mentioned in an encyclopedia, and far-reaching ramifications rank advertising specialists with

those of the learned professions.

Like other callings, advertising had the most primitive of beginnings. The first publicity medium was the public crier; he survives in Europe and in the cries of American newsboys on the streets today. Such criers, either making public announcements, or airing some information for the benefit of a trading citizen, were heard on the streets of towns in Palestine, Greece and in Rome. Beyond these cries were the pictorial signs with their appeal to the eye that time cannot dim. Modern advertising has never discarded the sign but has rather raised its drawing force to the nth power by an ingenious use of animated electric lights in an illuminating maze of mechanical effects as the leading streets of our cities nightly testify.

Advertising by any other medium than the crier and the sign was not known till the advent of printing, yet even then it languished in a long infancy. Not until the development of modern industry in the last century was the printing press largely availed of. It is true early newspapers were not without staid and prim little intimations from stationers, grocers and apothecaries which doubtless served their purpose; but, anyhow, advertising had to wait for a free and untrammelled press and mail facilities before coming into its own. Once meaning mere publication or an announcement relating to anything but the merits of merchandise. The word now embraces all the vehicles of publicity, printed and otherwise, utilizable by producers of commodities for distributing information regarding them. Through periodicals, circulars, catalogs, almanacs and calendars they reach millions near and far. Those who read the advertised printed word benefit by its educative value, which is as great as that of other knowledge imparted by books of instruction. Advertising in its broader aspects, in fact, has accumulated a vast literature of its own, and no one entering business life can count upon being equipped to meet competition without making a penetrating study of its psychology and methods, not to mention its service in shedding light on things a reader did not know before.

One phenomenal growth of newspapers and other mediums of publicity stimulated advertising to an extent that necessitated specialization and large organizations. Men of vision and great business ability formed agencies backed by extensive capital. They gather advertising clientele round them advising them as to mediums, and employ able writers and illustrators to produce work of the highest grade. On

this head it may be said of advertising that it has created a lucrative field for the exercise of literary and artistic abilities for which the possessors of such gifts find inadequate scope and reward in the more exclusive world of so-called literature and art. It is one of many other elements that have endowed advertising with a mental power and persuasiveness without which industry and commerce could not survive in their present dimensions, since the disposal of their huge production depends upon the channels of sale advertising opens to them.

News value frequently enters into advertisements, as in the announcements made by retail merchants in the daily press, whether occupying full pages or smaller space. In fact, there are many readers of newspapers who buy them solely for the advertisements they contain, whether of retailers or other merchants. The same may be said of not a few readers devoted to popular magazines, whose general advertising sections are frequently a storehouse of interests, country-wide and world-wide in scope. Figuring in them, embellished by effective illustrations, are advertisements of clothing, plate, jewelry food products, complexion aids, soap, beverages, musical instruments, sanitary appliances and house and office equipment, not to mention the financial announcements of great banks, and the advertising of rail, steam and insurance companies.

Mail order houses, which conduct most of their business through the post office, depend largely for their success on advertising in the magazines, the farm and religious press, the newspapers—notably a type of cheaply produced periodicals known as 'mail order journals'—and on catalogs and other advertising matter transmitted by post. The value of advertising is specially seen in the rural sections, where makers of farm equipment and fertilizers, breeders of farm stock, and producers or distributors of fodder, building matters and other farm requirements reach the farmers through the agricultural periodicals. A similar service, but over a much wider field, is rendered by trade journal advertising, which through numerous special publications having a national circulation links up local merchants with manufacturers of or traders in commodities they can sell at retail. Trade journals advertising also factory executives regarding new machinery, and is altogether an invaluable medium by which commodities ultimately reach the consumer.

Advertising is the main support of the periodical press. The revenue from it received by large newspapers runs

into millions of dollars annually. It has been such an open door to success, that it has led cautious business houses, rock-bound in conservatism, to utilize it to their immediate profit. It has expended the revenue of publications to an extent that enables them to exercise a strict censorship and bar out exploiters whose advertisements would bear investigation. Press vigilance and post office safeguards serve to protect advertising mediums generally from their wrongful use by swindlers and charlatans.

ADVOCATE (Lat. *advocatus*, from *advocare*, to call one's aid) is the name given in anct. Rome and in many modern states, including Scotland, to a forensic orator. The Eng. term for this is barrister or counsel. An A. of Aberdeenshire is not a barrister, but a solicitor, it having been decided by *M'Pherson v. Watt* 3 App. Cas. 254 that solicitors in that county had a right to the appellation. Prior to 1857 the name A. was given to those licensed by the archbishop in the Court of Arches, but since then barristers have been admitted to the eccles. courts.

ADVOCATUS DIABOLI, 'devil's advocate,' official (formally called *promotor fidei*, promoter of faith) app. by R.C. Church to state objections to any proposed act of canonization, as opposed to the supporter *advocatus Dei*; hence the modern colloquial use of the phrase for one who trumps up a case or brings forward an untruthful accusation against another.

ADVOWSON, the right of presentation to an Eng. ecclesiastical benefice vested in the holder and heirs for ever; a's are either *presentative* or *collative*. In the former the patron presents his nominee to the bp. with the request that he be instituted to the vacant living; in the latter case the bp. is himself the patron.

ADY, MRS. HENRY (JULIA CARTWRIGHT), author; b. Edgcote, Northamptonshire, Eng. Her contributions to literature, extending over a wide field of history and art, include biographies of *Sir Edward Burne-Jones* and *G. F. Watts*, and studies of *Beatrice and Isabella Este*, *Botticelli*, and *Raphael*. In 1880 she married the Rev. W. H. Ady, rector of Ockham, Eng., who died in 1915.

ÆDILES were Roman magistrates, first appointed 494 B.C. and elected from the plebs. At first they were the officers of the tribunes, and had to keep the decrees of the senate in the temple of Ceres (Livy, iii. 6, 55). The two curule or patrician Æ, were first elected 365 B.C.

(Livy, vi. 42). They had the care of the temples, public buildings, the sanitation of the city, the roads, presided at religious celebrations, and inspected the markets, weights and measures. Julius Cæsar appointed two more plebeian Æ, 45 B. C. to look after the wheat supply.

ÆDUI, OR HÆDUI a powerful Gallic race who lived between the Loire and the Saône, and were the first to form an alliance with the Romans.

ÆGADIAN ISLANDS (38° N., 12° 15' E.), off Sicily; largest Favignana. Pop. c. 7000.

ÆGEAN SEA (38° N., 25° E.); portion of Mediterranean, archipelago between Greece, Asia Minor, and Turkey. Islands include Samoa, Chios, Cyclades, Cos, Lesbos. See Map New States of S. E. Europe.

ÆGEUS (classical myth.), king of Athens, s. of Pandion and f. of Theseus; when Theseus returned from Crete after death of Minotaur, he forgot to hoist white sails as signal of his success, and A., at sight of black sails, concluding his s. was dead, threw himself into sea, which has since been called the Ægean.

ÆGINA (37° 45' N., 23° 30' E.), island, Greece; ruins of old temple to Aphæa. A. was originally subject to Epidaurus; inhabited by Dorians from c. IX. cent. B. C. became commercial state; introduced valuable coinage system; apparently joined Eretrian league; warred against Samos, VII. cent. B.C.; war with Athens broke out, 488, lasted till 481; Athenians worsted. After first Peloponnesian war, A. surrendered and became subject to Athens, c. 456 B. C. Æginetans expelled, 431 B.C., when Athens founded cleruchy in A.; old inhabitants restored by Lysander at end of war; island was Spartan base of operations in Corinthian war; henceforward historically unimportant; dominated successively by Macedonians, Ætolians, Attalus of Pergamum and Rome; subsequently became Venetian colony; plundered by Barbarossa, 1537; ceded to Turks, 1718; town was capital of Greece, 1826-28. A. has sponge fisheries; chief town, Ægina. Pop. 4500.

ÆGISTHUS (classical myth.), king of Argos; lived in adultery with Clycmenestra. Both were slain by Orestes (q.v.), s. of Agamemn., whom they murdered.

ÆGOSPOTAMI (c. 40° 30' N., 26° to 27° E.), river, Asia Minor; flows into Hellespont.

ÆLFRED ÆTHLING (d. 1036), younger son of Æthelred and Emma;

claimed Eng. throne, but defeated and blinded by Earl Godwin.

ÆLFRIC (fl. 1000), early Eng. author; abbot of Eynsham, near Oxford; wrote *Homilies*, *Grammar* and *Glossary*, and *Lives of Saints*; called *The Grammarian*.

ÆMILIA VIA, ÆMILIAN WAY (44° 30' N., 8° 52' E.), high road constructed by Romans, 187 B. C., from Rimini to Placenza.

ÆNEAS (classical myth.), s. of Anchises and Aphrodite; m. Creusa, dau. Priam, king of Troy. When Troy was in flames he carried away his f. and his household goods upon his shoulders, leading his s. Ascanius by the hand. His exploits, wanderings, and adventures are narrated in Virgil's *Æneid*. He is the legendary forefather of Romulus and Remus and the Julian gens in Rome, and is proverbial for his filial devotion (*pious Æneis*).

ÆNEID, the greatest work of Virgil and the national epic of the Roman people. It was completed in twelve books, but as it was not revised Virgil expressed a wish that it might be destroyed. It was, however, pub. after his death by Tucca and Varius. It contains an account of the wanderings and the settlement of Æneas after the siege of Troy.

ÆOLIAN HARP, musical instrument; consisting of strings of gut or silk stretched on box of thin deal or pine on which the wind is allowed to play; name derived from Æolus (q.v.).

ÆOLIANS, branch of Gk. race founded by Æolus (q.v.); originated in Thessaly, whence spread N. and S. and emigrated into Asia Minor.

ÆOLUS (classical myth.) god of winds who dwelt in Æolian Isle where he kept winds confined in caves; (2) king of Thessaly s. of Hellen; legendary ancestor of ÆOLIANS.

ÆON, a word meaning 'age' or 'eternity' denoting an infinite period of time; also a being that lives for ever. The Gnostics use the term to indicate manifestations from God i.e. spirits which form a separate existence having influence over phases of the world's progression.

AERATED WATERS are charged with carbon dioxide at high pressure, occurring naturally in springs together with salts in solution and frequently of medicinal value. They may be artificially prepared either through the effervescence produced by sodium bicarbonate and tartaric acid with various flavorings or by forcing compressed carbon dioxide from a steel cylinder into

water which is sold in bottles or syphons. See MINERAL WATER.

AERATION process of charging with air (e.g.) venous blood and plants. In plants the leaf is the organ by which it is carried on, oxygen being taken in and carbonic acid gas expired in breathing, while in daylight there is another process of a carbon being extracted from the carbonic acid in the atmosphere and oxygen being exhaled.

AERIALS. See ANTENNA.

AERODROME, one of the many names evolved from the development of aerial navigation, applied to an extensive tract of level ground in and above which airships can start and carry on their evolutions, or which can be used as a station with sheds or hangars for housing flying devices. The word is formed on the analogy of hippodrome. S. P. Langley, one of the pioneers of aerial navigation, designated as aerodromes the flying machines with wing-like appendages.

AERODYNAMICS, that part of the science of dynamics which treats of air or gases in motion. See PNEUMATICS.

AEROLITE, a mass of stony or metallic matter known to have fallen to the surface of the earth from beyond the region of the atmosphere. Sometimes a distinction is drawn between.

AERONAUTICS, term used to denote the entire science of aerial navigation. Aviation is specifically limited to flight in machines that are heavier than the air.

A free-flying or spherical balloon is an apparatus with an envelope containing a gas whose sp. gr. is lighter than the atmosphere for some considerable distance above the surface of the earth. It cannot be steered by the pilot and is practically at the mercy of air current (see BALLOONS). Dirigible balloons having a more or less fish shape equipped with a motor propeller and rudder with which they can be steered against a moderate wind are known as AIRSHIPS. Kite balloons used almost exclusively for military purposes are a combination of the elongated balloon and kite principals (see KITE). A parachute is a scientifically constructed umbrella-like apparatus which by compressing the air systematically regulates the descent of a body heavier than air.

The beginning of the development of the balloon was the work of two brothers Joseph and Etienne Montgolfier who were the sons of a paper manufacturer of Annonay. They seem to have been influenced by Cavendish's experiments relating to the weight of hydrogen and

by Priestley's paper on 'Different Kinds of Air.' From their own observation of the clouds they came to the conclusion that a paper bag filled with substance of a 'cloud-like nature' would float in the atmosphere. They experimented with paper bags over fires and found that they floated. This determined them to have a public exhibition at Annonay. On June 5, 1783, they inflated a bag, made probably of linen, though some authorities say that it was made of paper, over a fire of chopped straw. This balloon rose to the height of about $1\frac{1}{2}$ m. before it cooled sufficiently to descend about ten minutes after its ascent. The Montgolfiers, however, came to the conclusion that the ascent was due to the smoke of the fire, and did not realize that it was really due to the lightness of the heated air. This experiment attracted much attention, and steps were taken for the sending up of a hydrogen balloon in Paris. The prime movers in this were M. Faujas de Saint Fond, M. Charles, and two brothers named Robert. The balloon was filled with hydrogen made by the action of 500 lbs. of sulphuric acid on half a ton of iron filings, and took four days to inflate. The balloon was about 13 ft. in diameter, and weighed less than 20 lbs. The balloon, when liberated, rose to the height of about 3000 ft. and remained in the air for about three-quarters of an hour, and then descended in a field at Gonesse, where it was torn to pieces by a terrified and infuriated French peasantry. The two types of balloons have usually been differentiated as air balloons and fire balloons, or Robertières and Montgolfières. Following this experiment came another by Montgolfier, who sent up a balloon from Versailles carrying a sheep, a duck, and a cock. These animals descended, safely about eight minutes after the ascent, the only injury being to the cock, who was trampled upon by the sheep, although this probably occurred before the ascent. The first man-carrying ascent took place in Oct. 1783, when Pilatre de Rozier went up in a Montgolfier captive balloon, the inflation again taking place by means of fires of chopped straw which were carried in a brazier suspended under the balloon. In Nov. of the same year the first free ascent was made by Rozier and the Marquis d'Arlandes, who made an ascent in a fire balloon. They journeyed about 5 m. at a height of about 500 ft., descending safely in a field just outside Paris. In Nov. there seems to have been made the first man-carrying ascent with a hydrogen balloon at Philadelphia, seven days after the ascent of Rozier and D'Arlandes at Paris.

Longheed says that a carpenter named James Wilcox allowed himself to be persuaded to make the ascent, which was under the auspices of the Philosophical Academy. In Dec. Charles and Robert made an ascent in a free hydrogen balloon of about 27 ft. diam. They safely accomplished a journey of about 27 m. in just under two hours, when, Robert having got out, Charles made a further journey of about 3 m., rising to the height of about 2 m. and enduring some discomfort from the rapid ascent and the height to which he was carried. To Charles is due the credit for the ideas of a valve and a car suspended from a hoop attached to the balloon by means of silk netting. The first woman to ascend was Madame Thible, who went up from Lyons in 1784.

The development of the hydrogen balloon, however, was due also to the experiments which had already been made by Cavendish, who showed the lightness of hydrogen as compared with the air, and the work of Dr. Black and Tiberius Cavallo. Dr. Black had attempted to cause a calf-gut bladder to ascend when inflated with hydrogen, but had failed because of the heaviness of the calf-gut, but Tiberius Cavallo had inflated soap bubbles with hydrogen and floated them in the year previous to the first ascents by Montgolfier (1782). The first ascent in Great Britain took place about five months after the first Montgolfier ascent in France; the balloon was made by a certain Count Zambecchi, being about 10 ft. in diameter and weighing 11 lbs. It went up from the artillery ground in Nov. 1783, and descended about 48 m. from London in Sussex, having been in the air about $2\frac{1}{2}$ hours. At the beginning of the next year (Feb. 1784) a balloon was liberated from Sandwich, and descended in French Flanders; this was the first cross-Channel flight. The real introduction of aerostation into England, however, was made by Lunardi. He was secretary to the Neapolitan ambas., and in his letters gives a detailed description of the circumstances attending his first flight. His balloon was 33 ft. in diameter, and was visited by about 20,000 people during the time that it was on view at the Lyceum in the Strand. On Sept. 15, 1784, he made an ascent from the artillery ground by himself. A huge concourse of spectators, amongst whom was the Prince of Wales, watched the ascent. Lunardi took with him a dog, a cat, and a pigeon, and his balloon was fitted with oars by which he intended to try and navigate the balloon. One of the oars, however, broke shortly

after the beginning of the ascent. He landed first of all at a village in Hertfordshire after about $1\frac{1}{2}$ hour's travelling, and again continued his journey to Standon near Ware, which he reached after about a further $\frac{3}{4}$ hour's flight. This was the first real ascent in Britain, and attracted an enormous amount of attention. Lunardi became the lion of the moment, he was presented at court, and was received everywhere with extravagant enthusiasm. He made further ascents in Scotland in the following year, during one of which he traveled about 110 m. The first man-carrying cross-Channel voyage was made by Blanchard and Jeffries in Jan. 1785. Blanchard had already in the previous year estab. a reputation as an aeronaut, and by this and succeeding voyages he became known as one of the most famous of aeronauts. The cross-Channel voyage was accompanied by some perils, but was safely negotiated, the descent being made in the forest of Guineas. In the same year another attempt was made to perform this same feat by Rozier and Romain. The balloon used on this occasion was a combination of a Montgolfière and a Robertière. The actual ascent was made in safety, but the balloon having risen burst into flames, and the aeronauts were both killed. During the century which followed balloons were greatly developed, and were used for scientific and military purposes. Long voyages were undertaken and immense balloons were constructed for the purpose of carrying out various projects—the great Nassau balloon journey in 1836 from London to Weiburg, a distance of nearly 500 m., in about 18 hours. In 1863 Nadar constructed what was called 'Le Géant,' a very ambitious vessel, which was constructed for the purpose of making long voyages. The car of this balloon was exhibited at the Crystal Palace during the years 1863-64.

During the nineteenth century a number of long voyages were either made or contemplated, the two longest made being voyages of over 1000 m. In 1859 in America, and in 1900 from Paris to Korosticheff, a distance of 1193 m. In 1897 an attempt was made to discover the N. Pole from Spitzbergen by balloon, but Andrée and his two companions were never heard of afterwards.

The development of the balloon soon brought with it the possibility of scientific research, and various experiments were made during the early part of the nineteenth century. Most of the experiments were not at first carried out very carefully, and the results did not come up to expectations. Two ascents by the scientist Gay-Lussac, however,

gave some useful information regarding the upper air and the effect, or rather lack of effect, of the upper air on magnetic force. After 1805 the experiments seem to have ceased until the middle of the century. Between 1850 and the end of the century a number of important ascents were made for scientific purposes; the most important of these were the ascents made by Glasher between 1862-66. Altogether twenty-eight ascents were made, a number being made from Wolverhampton and from Woolwich. The chief problems that these ascents tried to solve were the height, density, and thickness of clouds, the direction and the rate of the various air currents, the amount of electricity in the air, and the comparison of readings of an aneroid barometer with those of the mercury barometer. The results of the observations were pub. in the British Association Reports between 1862-66. A number of extremely high ascents have been made, but these have always been attended with much danger. The highest was made in July 1901, when a height of some distance over 34,500 ft. was reached by two aeronauts from Berlin. To obviate the necessity of making these dangerous high ascents, unmanned balloons have been sent up with recording instruments attached that work automatically.

Although it is only about 1885 since balloon corps were organized by the armies of the various great powers, previous to that time they played an important part in the various campaigns of Europe. From the beginning they had attracted the attention of the military authorities, and we hear of their being used during the wars which followed the French Revolution. In June 1794 balloons were used for the purpose of reconnoitring by the Fr., who were fighting the Austrians, but the idea was not seriously developed, and in fact the ballooning corps of the Fr. were disbanded by Napoleon. But war balloons were used by the Fr. when fighting in Italy, but were at this period in charge of two civil aeronauts, there being no ballooning corps. In the American Civil War, at least during the beginning of that war, they proved themselves of very considerable value, in fact a small Federal balloon corps was formed during this period. During the siege of Paris they proved of great use in keeping up communications with the outside world, and sixty-four of them were dispatched between the beginning and end of the siege.

Dirigible balloons.—From the time of the beginning of balloon flights it was recognized that the great problem

before aeronauts was to be able to navigate the balloon safely through the air, and to make it to a very great extent independent of the air currents. The first means of propulsion tried was oars, but although in a calm atmosphere some little success was gained with them, it was recognized that this means could never be really successful. Oars were experimented with at the end of the eighteenth century, but the first attempt to navigate the balloon by means of a small, light engine came over fifty years later, in 1852, the experiment being made by Henri Giffard. Between that time and the end of the century many experiments were made, some of which attained a transient success, some met with almost instantaneous disaster. In 1897 an experiment by Dr. Wolfert with a small gasoline motor led to the explosion of the airship in mid-air and to the death of the aeronauts. From the year 1897 the development of the airship was the special work of the Count Zeppelin. In 1900 he made his first flight with a dirigible balloon which carried five men. It was made of aluminum, supported by gas-bags and driven by two motors, each about 16 h.p. His first experiment met with success, but the first Zeppelin airship was succeeded by another in 1905 with greater motor power; this was wrecked and was succeeded by a third, which met with great success. This airship carried eleven passengers and attained a speed of about 36 m. an hour. The fourth Zeppelin airship succeeded in traveling about 250 m. in 11 hours, but was wrecked by a storm in 1908, the wreckage catching fire and completely destroying the ship. In the meantime many other experiments had been carried out, notably by Santos Dumont, who circled the Eiffel Tower in the face of a fresh wind; while in England a number of experiments were carried out by the War Office with dirigible balloons. The most successful voyage was that of the 'Nulli Secundus,' which, leaving Farnborough, sailed round St. Paul's to the Crystal Palace, carrying two passengers and attaining a speed of about 20 m. an hour.

The study of artificial flight can be traced back practically through legendary story to the beginnings of history. As has already been pointed out, the history of aviation is older than aerostation, and during the middle ages we get many attempts to put forward a workable airship or to imitate the flight of birds by means of artificial wings. Leonardo da Vinci put forward theories concerning flight, and during the latter part of the seven-

teenth century and the beginning of the eighteenth we get many theories put forward and much research made concerning the theory of flight. Much experiment was done with artificial wings and with aerial screws. Amongst the names which may be mentioned in this connection are those of Bonelli, Morey, Pettigrew, and Cayley. To Sir George Cayley is given the credit of being the inventor of the modern aeroplane. Professor Beriet in his book *The Conquest of the Air* points out every essential to successful flight was given in the airship invented by Sir George Cayley. 'In fact everything was there in Sir George Cayley's idea—the wings forming an oblique sail, the empennage, the spindle form to diminish resistance, the screw propeller, the explosion motor, the calculation of the center of thrust, and the demonstration of the fact that displacement takes place towards the front. The author even describes a means of securing automatic stability.' This machine was described by Sir George Cayley in a paper contributed to *Nicholson's Journal* in 1809, and in the following year he produced the apparatus itself — at first without a motor, but later with a motor as well. The invention, however, was not successful, and during the trials the machine met with disaster. The next attempt at aviation that we hear of is in 1843, when Hensons, by a combination of aerial screws and supporting surface, tried to complete a successful machine. The attempt was not a success, although it was followed up in the succeeding years by many other attempts, especially by his partner, Stringfellow. Other contributions to the science of aviation were made by Pinaud and Mouillard in France. These were of great value to their successors.

During the year which followed many attempts to solve the problem of aerial flight were made, but none of them met with great success. The difficulties in the way were enormous; the science of aerodynamics had yet to be developed; flight in the air was flight through a substance, the laws of which were only dimly beginning to be understood. The science of aerodynamics, which even now is only at its beginning, was developed during the latter part of the nineteenth century by Sir Hiram Maxim, and Prof. Langley, an American physicist. By 1896 the experiment of Langley had been so far successful that he made an aeroplane which, although it did not by its own efforts lift itself from the ground, flew for a distance of about half a mile along the Potomac R. Further experiments had in the meantime been carried out by Sir Hiram Maxim

and N. O. Ader. The former to a very great extent helped to solve the problem of light motors by producing in 1894 an aeroplane with an engine which weighed not quite 2 lbs. per h.p. But in spite of this the aeroplane failed to fly. Ader seems to have been the first inventor to produce a machine which lifted itself from the earth by its own effort. Between 1896 - 1903 he produced three machines, none of which were very successful, but which embodied new ideas, and one of which flew for about 350 yds. The first aeroplane flight may be said to have taken place at Satory in 1896, when Ader's machine lifted itself by its own power and flew for the short distance already mentioned. In the meantime experiments were being made with soaring machines and gliders. The chief name to be mentioned in connection with this movement is that of the Berlin engineer, Otto Lillenthal, who, with an arrangement formed on the plan of birds' wings, attempted to imitate their 'soaring flight.' These wings were made of a light framework covered with a light fabric with two rudders in the rear. In the center of this framework Lillenthal was poised, and with an apparatus of this description he made over 2000 flights in safety. He met his doom while using a biplane glider, falling from a height of about 80 metres and breaking his neck. These experiments were further carried out by Chanute in New York, he introduced several new ideas. The experiments were also continued at the beginning of the present century by the brothers Wright. These two young Americans, Orville, and Wilbur, were originally cycle makers of Dayton, Ohio. They followed up the ideas which had already been promulgated by Lillenthal and Chanute. The result of these experiments was that in 1903 the brothers Wright produced their first aeroplane. The first invention of the Wrights was simply an aeroplanethat flew in a straight line, but this received many modifications, and in 1908 they came to France to carry on experiments there. So much mystery had surrounded them, and so many canards had been spared concerning them, that their successful flights came to the many as a great surprise. During the experiments Wilbur Wright created a record by remaining in the air for over an hour while carrying a passenger. He also attained a speed of 60 kilometers an hour. During this period, however, great strides had been made by many other inventors. Farman had succeeded in producing a machine with which he remained in the air for nearly forty-five minutes, and he was closely followed, and sometimes surpassed, by the Frenchman Leon Dela-

grange. The best results, however, were undoubtedly attained by the brothers Wright, who succeeded in remaining in the air for nearly 2½ hours. The year 1909 may be taken as the real era of the beginning of successful aviation. In that year records were made only to be broken, and the ultimate success of the monoplane and biplane was proved by many successful experiments. On July 25, 1909, Bleriot flew the Channel, a feat which has been often performed since; this flight was made on a monoplane, but in the same year Farman covered a distance of nearly 140 m. in four hours on a biplane. A table of the chief early events in aviation is given below.

The employment of airplanes in the World War in all its phases is discussed in the article **WORLD WAR**, and in the section **AIR RAIDS**, below.

When the great struggle ceased there was an immediate revival of interest in endurance tests and long distance flights, and a number of tests followed which broke all previous records in the history of aviation. The war had developed a

class of airmen to whom danger was unknown, and they attempted feats which previously would have been conceived even by the bravest. Among these feats were attempts which finally succeeded in trans-oceanic flights. The honor of first having crossed the ocean in a heavier-than-air machine fell in the United States, when, on May 16, 1919, the navy seaplane N. C.-4, starting from Trepasse Bay, Newfoundland, reached Plymouth, England, on May 31, having stopped off in the Azores Islands and Libson, Portugal. The entire distance traveled was 3,925 nautical miles, and the total flying time was 57 hours and 16 minutes. The commander of the N. C.-4 was Lieut. A. C. Read. This successful flight was followed by one even more sensational because it involved no stop on the way, and because the dangers attending it were greater. This was made by Capt. John A. Alcock, of England, who, with one companion, flew from St. Johns, Newfoundland, to Clifton, Ireland, a distance of 1,960 miles, in 16 hours and 12 minutes. The voyage began on Jan-

TABLE OF EARLY AVIATION RECORDS

DATE	NAME	PLACE	DISTANCE	FLOWN
1890	Clement Ader	France	164 feet	
1903	Orville Wright	U.S.A.	852 feet	
1903	Orville Wright	U.S.A. (Ohio)	20¾ miles	
1903	Orville Wright	U.S.A.	50 miles	1678 yds.

<i>Over-Sea Flights</i>				
DATE	NAME	PLACE	TIME	
			H.	M. S.
1909, July 25	Blériot	Calais to Dover	0	37 0
1910, June 2	Hon. C. S. Rolls	Dover to Sangatte and back	1	30 0
1910, Dec. 18	T. Sopwith	Eastchurch to Beaumont	3	30 0
1910, Sept. 11	R. Loraine	Holyhead to Dublin (60 miles)	—	—
1911, Mar. 5	Lieut. Bague	Nice to Gorgono (140 miles)	—	—
1912, Mar. 7	Henri Dalmont	Hendon to Paris	3	16 0
1912, April 26	Vivian Hewitt	Holyhead to Dublin	1	15 0

<i>Over Land-Flights</i>				
DATE	FLIGHT	NAME	DISTANCE	TIME
1910, Apr. 27 and 28	London to Manchester flight	L. Paulham	188 miles	About 4 hours actual flight
1911, July	Circuit of Britain flight	Beaumont	1010 miles	H. M. S. 22 28 13 (actual flight)
1911, Sept.	Aerial Post initiated	Hamel & Hubert	—	—
1911, Aug.	St. Louis to New York	H. Atwood	1265 miles	28 9 0

<i>Speed Records</i>				
DATE	NAME	PLACE	DISTANCE	AV. MILES PER HOUR
			M. YDS.	
1908	Wilbur Wright	France	12 753	28.4
1909	G. H. Curtiss	France	18 1129	47.6
1910, Aug.	T. Radley (Blériot)	Lanark	1 0	75.95
1911, June 16	Nieuport		3 0	80.76

Altitude Records

DATE	NAME	PLACE	HEIGHT
1908	Wilbur Wright	France	360 feet
1909	H. Latham	France	2723 feet
1910	G. Legagneux	France	10,171 feet
1911, Sept. 14	Garros	France (St. Malo)	13,944 feet
1912, Sept. 6	Garros	France	16,077 feet
1912, Sept. 17	G. Legagneux	France	17,914 feet

uary 14, 1919, and was accomplished only with the greatest dangers and difficulties. Much of the journey was made in darkness as the moon and sun were obscured by clouds. Alcock was later killed in an airplane accident by flying over Normandy. See ALCOCK, SIR JOHN.

An unsuccessful but brilliant attempt was made by Hawker and Grieve, who attempted to cross the Atlantic in a Sopwith bi-plane, on May 18, 1919. They flew from St. Johns, directly toward Ireland, but after traveling 12½ hours and making 1100 miles, the circulation system of the machine became clogged and they were obliged to descend. They were picked up by a Danish steamer and were landed in England. Other notable events in flying in 1919 were the New York - Toronto air race and the trans-continental race from New York to San Francisco and return. In the first named contest the winner was Kenneth B. W. Maynard, who averaged more than two miles a minute for the total distance of 1,042 miles. Maynard also won the trans-continental race, completing the round trip of 5,400 miles in 67 hours, 3 minutes and 40 seconds. On December 10, 1919, Capt. Ross Smith, an Australian aviator, completed a flight from London to Australia, which was begun on November 12. The first dirigible to cross the Atlantic was the British airship R-34, which left East Fortune, Scotland, on July 2, 1919 and landed at Mineola, N. Y. in 108 hours, 12 minutes, covering a distance of 3,130 miles. The return voyage was made in 74 hours and 56 minutes. On November 1, 1920 the first American passenger airline service was inaugurated to operate on a daily schedule between Key West and Havana, a distance of about 90 miles. Many passenger lines had already been established in Europe and passenger service between important cities had become common. For the year ending May 1, 1920, 38,955 flights had been made in Great Britain and a total of 70,000 persons were carried. On the continent also many regular lines for passenger traffic were in successful operation. A 9,000 mile flight from Mitchell Field, New York City, to Nome, Alaska, was made in the summer of 1920 by four airplanes of the United States Army Air

Service. The flight was begun on July 15, 1920, and the round trip consumed 45 days. During 1920 faster travel by airplane was achieved, and on December 12, Sadi Lecoq broke the world's record for 4 kilometers (2½ miles). He made this distance in 46 seconds, at the rate of 195.5 miles an hour. Flights of longer duration were being accomplished, and on June 4, 1920, Lieuts. Bous-soutrol and Bernard, flying from Etampes, France, were in the air continuously for 24 hours, 10 minutes and 7 seconds. A new world's record for altitude was made on February 27, 1920 by Major R. W. Schroeder of the United States Air Service. He reached a height of 36,020 feet, but the record certified by the Aero Club of America was 33,113 feet. The Aerial Mail Service was inaugurated on September 8, 1920, when a mail-carrying airplane left Mineola Field, New York, for San Francisco. See AIR MAIL SERVICE. Experiments continued in 1920 on the perfection of the helicopter, a machine in which lifting screw propellers revolve about a verticle axis for the purpose of raising the machine directly from the ground. Louis Brennan, the inventor of the monorail gyroscopic train, made marked progress in the development of a successful helicopter. In 1921 commercial and civilian flying in the United States increased 20 per cent over the previous year. 1200 aircraft were being operated by civilians, with a flying record amounting to more than 6,500,000 miles and carrying approximately 275,000 passengers.

There were important developments in new types of airplanes in 1921. The Larsen, all-metal armored monoplane, carrying machine guns, was successfully put into service and later in the year secured the world's endurance record. A torpedo-carrying plane and a navy scout plane were developed. In Europe also there were mechanical improvements, but chiefly in the direction of refinement of line and increased efficiency. In England a new type of monoplane was brought out during the year. This machine attained a speed of 187 miles an hour.

There were many notable performances in the air in 1921. Lt. W. D. Coney won a trans-continental flight from San

Diego, Cal. to Jacksonville, Fla., 2,180 miles, in 22 hours, 27 minutes. An important long distance passenger flight was made during the year by the American 11-passenger flying cruiser, Santa Maria, which landed at New Orleans after a complete tour of the eastern section of the United States. The record for the world's endurance test was won on December 30, 1921 by Edwin Stinson and Lloyd Bertaud, who were in continuous flight for 26 hours, 19 minutes and 35 seconds, at Mineola, N. Y. The record was made in a Larsen airplane. The average flight was 85 miles an hour. The American speed record was broken by Bert Acosta in a Curtis navy racer, at Mineola, November 22, 1921, while the altitude record of over 37,800 feet was won on September 28, 1921 by Lieut. John A. McCready.

Commercial aviation underwent rapid development in Europe, in 1921. There were during that year 20 air lines covering the total distance of 6,000 miles. France held first place with routes covering 2900 miles; Germany, second, with 2000 miles; and England, third. Imports and exports of considerable value were carried by this service during the year. Regular commercial service was carried on between nearly all the important cities of Europe. There were comparatively few accidents.

Notable advances in aviation were made in 1922. These included an automatically controlled plane, which by the aid of a new device stabilizer flew 200 miles without being actuated by human agency. A tailless plane which developed high speed was built in France. On October 5 and 6, Lieuts. J. A. McCready and O. G. Kelly, of the United States Army Service, flew continuously for 35 hours, 18 minutes, exceeding the previous record for duration. The same aviators, on November 3 and 4, flew from San Diego, Cal., to Indianapolis, Ind., 27 hours, 52 seconds, without stop, in an endeavor to establish a non-stop transcontinental flight. The rapid development of the motorless glider or sail plane attracted wide attention in 1922. There were several glider meets, both in the United States and in Europe and a number of new duration records were made and broken. Some of these machines were built to remain in air for over three hours.

Several long distance flights over the ocean were a feature of aviation in this year. Lieut. Walter Hinton attempted a hydroplane flight from New York to Rio de Janeiro; and two Portuguese aviators attempted to fly from Lisbon, Portugal, to Pernambuco, Brazil. Major

W. T. Blake, an English aviator, undertook a round-the-world flight. The first two of these attempts were finally successful. Major Blake was obliged to abandon temporarily his attempted flight around the world. See AIR SHIPS, AIR MAIL SERVICE, BALLOONS, FLIGHT AIR RAID, etc.

Air Raid, an attack by air on an enemy position; introduced by the Germans during the World War as a means of 'frightfulness' against undefended towns; the British and French, at any rate in the earlier stages of the war, employed their aircraft for purposes of reconnaissance and directing the fire of the artillery. On Aug. 9, 1914, a zeppelin bombed the French frontier town of Lunéville, and thereafter the Germans gradually developed a system of air raids in all theaters of war. Their military value was slight, and they failed to break down the morale of the civilian populations. In 1914, 45 bombs were dropped on Paris; in 1915, 70; in 1916, 61; in 1917, 14; in 1918, 396; causing in all 1,211 casualties (402 killed and 809 injured). Fifty-one German airship and 57 aeroplane raids on Britain were responsible for 4,820 casualties (1,413 killed and 3,407 injured). The first zeppelin raid on this country took place on Jan. 19, 1915; and the last on April 13, 1918; airships penetrated as far W. as Liverpool and as far N. as Edinburgh and Aberdeenshire; six were brought down and destroyed. Of eleven airships which set out to bomb Britain on Oct. 20, 1917, only four returned safely, the remaining seven coming to grief in France and the Mediterranean. The first daylight aeroplane raid took place on Dec. 24, 1914, and the last on June 17, 1918.

From about the end of 1915 measures of defense became more adequate, and the London aerial defenses soon became virtually impenetrable to enemy air raiders. Owing to the vigilance of the Brit. navy in the North Sea it became impossible for Ger. scouting aircraft to obtain any precise idea of the prevailing weather conditions over the British Isles. Meanwhile, the Allies had not ignored this new and vital form of warfare. The first Brit. air raid was carried out by naval airmen on the zeppelin sheds of Dusseldorf on Sept. 22, 1914. Fr. aviators bombed Freiburg (Dec. 8), Saarburg (Dec. 18), and from that time onwards maintained an incessant air-raiding campaign on enemy military positions. Within twelve months Brit. bombing aeroplanes were actively engaged in many parts of the world; on the western front and along the Belgian coast; combating the U-boat

peril; assisting the Russians; operating in Italy, Dardanelles, E. Africa, Egypt, and Mesopotamia. Constantinople was first bombed on Nov. 15, 1917, by Brit. airmen, traveling by easy stages from London. In September 1917 a 'reprisal squadron' was formed to carry the aerial war into Germany and ultimately, one after another, towns in the Rhine valley were visited. On the formation of the Independent Force, R. A. F., in June 1918, the campaign was redoubled, and objectives further afield were reached at Stuttgart, Offenburg, and Frankfurt. But for the coming of the armistice (Nov. 11), Berlin itself would have been attacked, a special squadron of four-engine Handley-Page machines having been prepared for the purpose. Other phases of Aeronautics will be found treated under the titles FLYING, BALLOON, HYDROPLANE, in their proper alphabetical order in this and other volumes of this work.

Airship, term now generally applied to a dirigible balloon, which differs from the aeroplane in being lighter than the weight of the air which it displaces, and consequently floats, for precisely the same reason that a cork floats in water. The problem of controlling the direction of balloons has exercised the minds of many inventors since the beginning of ballooning. In 1852 Giffard attached a 3-h. p. steam engine to the car of a cigar-shaped balloon, and drove it at from 6 to 8 m. per hour; the brothers Tissandier (1884), employed an electric motor and spindle shaped balloon, and were so successful that the Fr. War Department conducted experiments which culminated in the *La France*, which attained a speed of $4\frac{1}{2}$ m. per hour, and made seven voyages before being burned in its shed. Within the following fifteen years the internal-combustion petrol engine was developed, and in 1895 Santos-Dumont began the construction of airships fitted with this kind of engine, and this established it as the motive power for dirigibles. All these experiments were made with gas-bags shaped more or less like an elongated egg, retaining their general shape by pressure of the hydrogen within, and provided with a tail to secure steadiness and enable progress to be made in the desired direction, also with flat fins, fitted with hinges to act as rudders and elevators (See AEROPLANES). The weakness of this type of airship lay in their tendency to change their shape owing to decreasing pressure of the air as the balloon rose, such changes resulting in unequal strain on the rigging of the car, and in extreme cases in rupture of the envelope. These drawbacks

were obviated by the use of *ballonets*—(i.e.), separate gas-tight compartments, containing air, the pressure of which could be increased or decreased at will by the use of an air-pump or release valves, thus enabling the airship to maintain its shape, both in ascending and descending, without undue release of gas. Such non-rigid airships are still used, especially by the navy for patrol and convoy work. The British N.S. (North Sea) 12 has an over-all length of 262 ft., a displacement of 360,000 cu. ft., and a carrying capacity of about 4 tons. Any considerable increase on these dimensions leads to practical difficulties, one of which is overcome by the use of a rigid girder as keel, from which the gondolas containing engine, fuel, load, and crew are slung. This type is known as semi-rigid.

While Santos-Dumont was making his experiments, Count von Zeppelin was engaged in the construction of the first practicable rigid airship on a plan unsuccessfully tried by Schwartz in 1897, but with considerable modifications. He adopted a rigid framework of aluminum lattice with seventeen ballonets, each of which had a separate gas-bag. Over all was an envelope of linen and silk treated with pegamoid. It had the form of prism of twenty-four sides, the ends arching to blunt points. It was 420 ft. long and 38 ft. in diameter, and by means of two petrol engines (16 h.p.) attained a speed of 20 m. The construction proved too weak for the great length, the gas-bags were not gas-tight, and the engines were of insufficient power. In later machines these faults were corrected, and in 1909 a zeppelin accomplished a voyage of 870 m. in 37 hours.

In the modern form of the rigid airship the framework consists of a series of 'rings' or polygons built up in lattice of aluminum alloy, and connected into a complete skeleton. By means of radial steel wires the interior is marked off into compartments, each of which contains its own gas-bag, with an air-space between the gas-bag and the outer covering which clothes the whole framework. In the case of the most modern airships water ballast is also provided. The lower part of the framework is specially strengthened to support the cars which contain the engines, etc. Tail, rudders, and elevators, worked from the cars, are provided. Such rigid airships attain a length of 700 ft., have a capacity of 2,000,000 cu. ft., and can lift over 30 tons. During the World War zeppelins were used for air raids on the British Isles, which, though at first successful, proved in the end more fatal

to their crews than to their would-be victims. They rendered good service, however, at the battle of Jutland. British airships were also valuable as scouts, and blimps (non-rigid) played a considerable part in submarine-hunting. Helium (non-inflammable) will probably supersede hydrogen as the levitating gas. The airship record is held by the British R-34, which in July 1919 flew from East Fortune (Haddingtonshire) to New York in 108 hours, and returned to Pulham (Norfolk) in 73 hours. So rapid, however, has been development, that in March 1920 R-34 was announced as obsolete, and thenceforth only to be used for experimental purposes.

The first successful use of helium as a substitute for hydrogen gas was made on December 1, 1921, when the United States navy non-rigid airship C-7 was successfully inflated and made two successful trips from the naval air station at Hampton Roads, Va., which was repeated on the following day and subsequently. Helium has the distinctive value of being non-inflammable and will not explode. It does not deteriorate as rapidly as hydrogen, which becomes impure when long kept in a dirigible.

The building of huge dirigibles was undertaken in 1920 but was checked by the series of terrible disasters which overtook some of the largest of these airships, as is noted below. The successful flight of the R-34 across the Atlantic has already been described. The United States Government authorized the construction of the gigantic airship R-38 in England. This had a length of 694.5 feet and a diameter of 85.5 feet. It was equipped with 6 motors of 350 h.p. each, and had a gas volume of 2,724,000 cubic feet of hydrogen. The R-38 was completed and was given several tests which were deemed successful. Its career was brought to an end, however, on August 24, 1921, during a trial trip under the command of a British commander, Lieut. A. A. Wann, and a British crew of 49 officers and men. There were on board, in addition, 6 officers and 11 non-commissioned officers of the United States Navy. The ship had been re-named the Z R-2. Suddenly, while over the city of Hull, at a distance of 1200 ft., the huge gas envelope suddenly collapsed and broke in two. The wrecked airship fell into the river, carrying with it those who had been unable to escape by leaping through the trips of the main car, equipped with safety parachutes. Those lost in the disaster numbered 62, of whom 2 subsequently died of injuries in the hospital. A board of inquiry blamed the disaster on a lack of proper co-operation and supervision when the

designs of the dirigible were first prepared. In the autumn of 1921 a large, semi-rigid dirigible, Roma, purchased by the United States Government from Italy, arrived and was assembled at Langley Field. On February 21, this dirigible while on a trial voyage, exploded at Hampton, Va., 34 members of the crew were either killed or died of injuries. No satisfactory reason was found for the disaster, although it was attributed by some to the fact that helium had not been used in place of hydrogen for inflation.

AEROPLANE. See AERONAUTICS.

ÆROSTAT, a name indicating a balloon or flying machine; also a balloonist or aeronaut. It is derived from aerostatics, a science treating of the equilibrium of elastic fluids or that of bodies sustained in them, and accordingly embraces aeronautics, or aerial sailing.

ÆSCHINES (IV. cent. B.C.), Gk. orator and statesman; speeches rank next to those of his rival Demosthenes; member of embassy sent to Philip of Macedon (347), whose policy he defended against Demosthenes; exiled to Rhodes.

ÆSCHINES (V. cent. B.C.), Athenian philosopher friend of Socrates; wrote dialogues on virtue, riches, death, etc.

ÆSCHYLUS (525-456 B.C.), father of Gk. tragedy; b. Eleusis; fought in Grecian wars against Persia, and present at battles of Marathon, Salamis, Artemisium, and Plataea; began writing for theatre at an early age, and produced about seventy dramas, of which only seven survive: *The Suppliants*, *Persoe*, *Seven against Thebes*, *Prometheus*, *Agamemnon*, *Choephoroe*, and *Eumenides*. He was the greatest of Gk. tragic poets and differed from his rival Sophocles in that his plays deal with the larger issues of fate, and by their grandeur of conception, while Sophocles deals more particularly with the personal amenities of human life. Tradition tells that he was warned he would meet his death by the fall of a house, whereupon he retired to the fields and was killed by an eagle letting a tortoise fall on his bald head.

ÆSCULAPIUS (classical myth.); god of medicine; s. of Apollo and Coronis; f. of Hygieia (health) and Panacea (all-healing). A. searched out the hidden powers of plants and herbs, and discovered cures for the various diseases which afflict mankind. He was slain by Zeus with a flash of lightning for having restored several persons to life.

ÆSIR, a race of gods who, according to Scandinavian mythology, controlled for a time the destinies of that country.

Nerthus, the protector of sailors and fishermen, is given prominence among them.

ÆSOP, ÆSOPUS (VI. cent. B.C.), Phrygian fabulist and philosopher; originally a slave, but received his freedom from his master, Iadmon; travelled through Greece and Egypt, and resided chiefly at court of Croesus, king of Lydia. The Delphians accused him of having stolen a sacred vessel from temple of Apollo, and put him to death by hurling him from a high rock, 561 B.C.; famous for the fables, which were narrated by him on various occasions, but never committed to writing.

ÆSTHETICISM, generally applied to the pose of complete attachment to æsthetic principles, whose apostle was Wilde (*q.v.*); an absurd and ephemeral side-issue of the Æsthetic movement represented by Keats, Tennyson, Rossetti, and Morris; cleverly burlesqued in Gilbert and Sullivan's opera, *Patience* (1881).

ÆSTHETICS (perceptible by senses), applied by Baumgarten, XVIII. cent., to science of taste or beauty, though used more nearly in Gk. meaning in Kant's 'Transcendental Æsthetic,' dealing with the conditions of sensuous perception.

Plato, following his ideal theory, affirmed an absolute beauty, from which was derived the beauty of particular things; Beauty not clearly separated from the Good and the True. Aristotle defined the beautiful as a mean between extremes, and resolved it into order, symmetry, definiteness, and a certain magnitude relative to the perceptive capacity. Art aimed at immediate pleasure, with no ethical purpose. In modern times Baumgarten limited æsthetics to the confused conceptions from the senses; the clear conceptions of truth were apprehended by reason, the higher intellectual power. Lessing (*Laocoon*) distinguished the provinces of poetry and painting, and excluded from the plastic art the representation of the repulsive. Kant affirmed the subjectivity of beauty and defined it according to his categories; the beauty of art inferior to that of nature. According to Schelling, the identity of subject and object is clearly seen only in artistic perception. Hegel affirmed the beautiful to be the realization of the abstract ideal; the appearance of the Idea in a sensuous medium. Schiller, Winckelmann, Fichte, and Herbart have also written on the subject.

ÆSTIVATION (zool.), state of torpor undergone by some animals, (*e.g.*), snails, during the hot season, contrasted with

hibernation; (bot.) folded arrangement of a flower bud before summer.

ÆTHELFLED, dau. of Alfred the Great; *m.* Æthelred, Earl of Mercia; sent expedition against Welsh; constantly in conflict with vikings.

ÆTHELING, Anglo-Saxon term applied to those of noble or kingly birth, almost exclusively confined to sons of royal family of Wessex.

ÆTHELRED (*d.* 716), king of Mercia; ravaged Kent, and destroyed abbeys and churches; afterwards abdicated (704), and became abbot of Bardney.

ÆTHELRED I. (866-71), king of West Saxons; *s.* of Æthelwulf; won great victory over Danes at Ashdown; succ. by bro., Ælfred the Great.

ÆTHELRED II., 'THE UNREADY' (968-1016), king of the English; succ. 979; 'unready' or 'redeless' means lacking in counsel; adopted foolish policy of buying off Danish invaders; *m.* Emma, dau. of Richard, Duke of Normandy, thus paving way for Norman Conquest.

ÆTHELSTAN (895-941), Saxon king; *s.* of Edward the Elder; grandson of Ælfred the Great; succ. 925; won brilliant victory at *Brunanburh* over allied Celts and Danes; praised by chroniclers as wise and vigorous ruler.

ÆTHER, ETHER.—From early times philosophers have recognized the necessity of some medium filling all apparently empty space; hence various 'Æthers' have been supposed to exist, the properties of which varied according to the physical phenomena for whose explanation they were necessary. The only æ. theory to survive is the one invented by Huygens to explain the propagation of light. More recent work has shown that the properties necessary for the propagation of light are just those required for the explanation of electromagnetic phenomena. The modern view is that the whole universe consists of a perfectly continuous, incompressible medium, as a whole completely at rest, frictionless and unresisting to the ordinary motion of matter through it. The medium possesses considerable rigidity, which property might be conferred on it if throughout the whole medium there exists a system of vortex filaments or rings of exceedingly small dimensions. The elasticity of the æ. is regarded as 'perfect'. The property of the æ. analogous to rigidity is probably electric in its origin, and it is accompanied by a quasi-inertia, which has to do with magnetism. The two properties together enable transverse electro-magnetic waves

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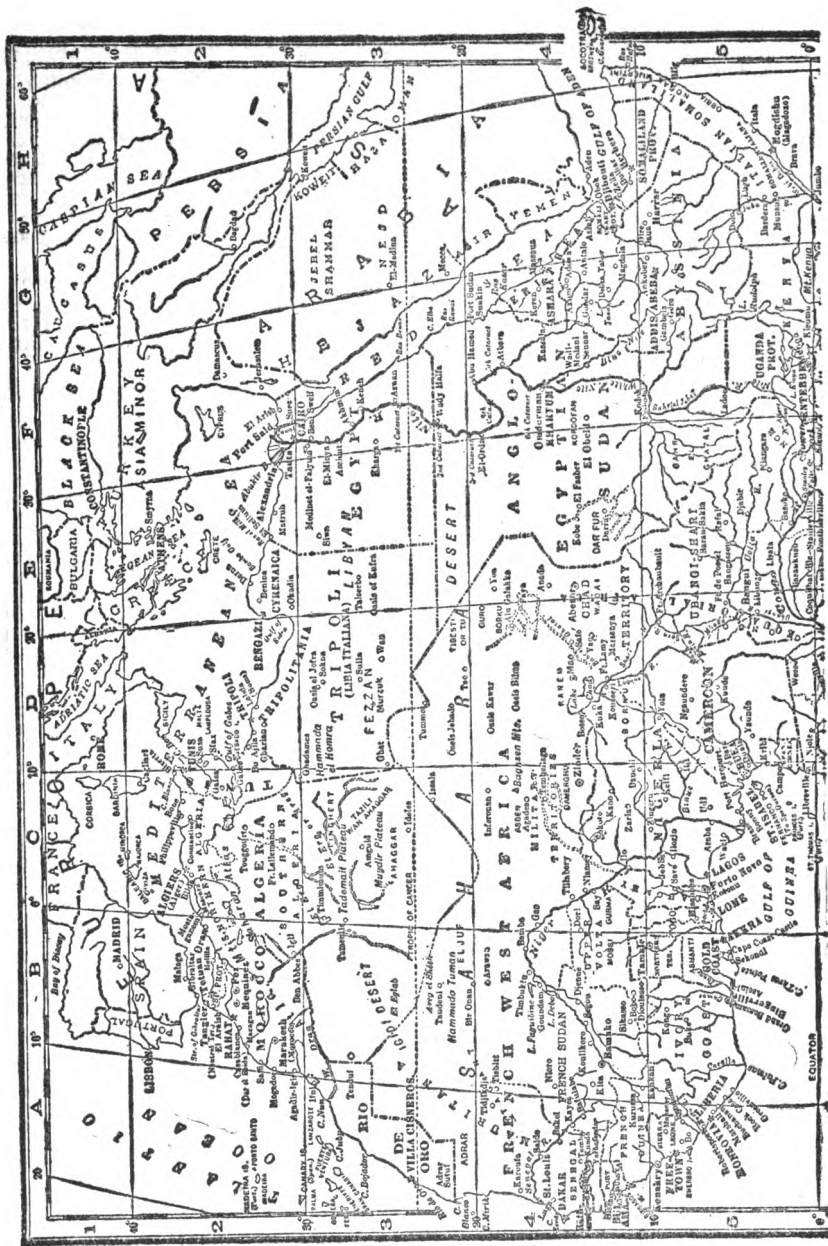
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and in S. heaths. Fauna includes lions, leopards, panthers, jackals, hyænas, elephants, rhinoceroses, hippopotami, zebras, camels, buffaloes, giraffes, antelopes, baboons, gorillas, crocodiles, pythons, ostriches, secretary birds, locusts, and tsetse flies, many of which are peculiar to Africa.

Geologically, Africa is old; and its stability is disturbed neither by great earthquakes nor by volcanic eruptions. Slight earthquakes at times disturb the comparatively new Atlas regions, and volcanic eruptions the coast lands round the Bight of Biafra, and an eastern belt from Kilimanjaro to the Red Sea. A vast connected but irregular area (the bulk towards the E.) is covered by Archean rocks, gneisses, schists, and granites; recent deposits cover the greater part of Fr. W. Africa, and parts of Algeria, Tunis, and Tripoli; and cretaceous rocks bulk largely on the Moroccan coast and parts of Tripoli and Egypt.

Political Divisions.—As a result of the Great War many of the political boundaries will have to be changed. The former Ger. colonies—Togoland, Kamerun, Ger. E. and S.W. Africa—are at present administered under mandates from the League of Nations. Until the future status of these areas is finally determined, no full description of political divisions is possible. The Allies demand extensions of territory, and are arranging exchanges of areas which they at present hold. Britain established a protectorate over Egypt in December 1914. Her possessions are Basutoland, Bechuanaland, E. Africa Protectorate, Gambia, Gold Coast, Nigeria, Nyasaland, Rhodesia, Sierra Leone, Somaliland, Swaziland, Uganda, Union of S. Africa (Provinces of Cape of Good Hope, Natal, Orange Free State, and Transvaal), Walfish Bay, Zanzibar, Egypt, and Egyptian Sudan; total area, 3,500,000 sq. m. France has Algeria, Fr. E. Africa, Fr. Equatorial Africa, Fr. W. Africa, Madagascar, Sahara, Tunis, and Protectorate in Morocco—in all c. 4,300,000 sq. m. Belgium has Belgian Congo (formerly Congo Free State)—900,000 sq. m. Italy has Eritrea, Tripoli, and Ital. Somaliland—about 600,000 sq. m. Portugal has Angola, Port. E. Africa and Guinea—c. 800,000 sq. m. Spain has Río de Oro and Muni River Settlement—c. 90,000 sq. m. Abyssinia with 350,000 sq. m., Liberia with 40,000 sq. m., are independent states. Total pop. c. 180,000,000.

Peoples.—Majority of inhabitants are negroes, of whom two main groups occur—negroes proper in northern half and Bantus in S. of continent. Negroes proper have many different languages, while Bantus all speak Bantu dialects.

Other inhabitants include Bushmen, Eastern Hamites, Libyans, Semites, while intermingling has resulted in large number of tribes of mixed race. Bushmen are brown nomadic race of hunters, and with the Hottentots, who are said to be racially akin to them, formerly inhabited Cape Colony, but were driven N. to Kalahari desert; Libyans, or Berbers, white race, occupy Algeria and Morocco; and Semites, or Arabs, are found in E. and N.E. Semito-Hamites chiefly inhabit Abyssinia. Equatorial regions from Uganda to the Gabun are inhabited by pygmy people—dark brown race of hunters concerning whom little is known. Original African stocks are generally supposed to have been negroes and Bushmen, of whom former probably had original home near the large lakes, while latter have been put down as primeval inhabitants of southern regions. Hamites apparently spread from Horn of Africa, and enforced emigration of negroes, whose subsequent mingling with Bushmen probably produced Hottentots. Libyans coming from N. also intermingled with negroes, which resulted in the Fulas. A most important migration was that of Zulu tribes toward N., chief tribes being Matabele and Angoni. Madagascar was early occupied by Malayo-Indonesian race known as Hovas, who are still chief group of its population, others being Malagasy and Negroid tribes.

History—Ancient Times.—When the Greeks visited the southern continent they found the two civilized states of Egypt and Ethiopia planted at the corner of a vast country which they named Libya; they drew their knowledge of Libya principally from Egyptians and Carthaginians. Herodotus relates that an Egyptian king was said to have sent out an expedition, c. 610 B.C., which circumnavigated Africa. The Romans named this country Africa, adopting the Carthaginian word, which may have meant colony or been derived from *pharikia*, 'country of fruit,' or from name of Berber tribe of Aouraghen, formerly *Aouragha* (pronounced Africa).

Africa, excepting the northern strip, is a continent without a history; ethnology goes to prove that primitive population consisted of pygmies, who still remain in Central Africa; negroes believed to be immigrants who entered from Arabia; immigrants from Asia supposed to have conquered original population of Upper Egypt before being subdued themselves by Negada dynasty in 4th millennium B.C. Egyptians, Phœnicians, and Greeks established first settlements known to history. Egypt, conquered by Persians in 525 B.C., submitted to Alexander the Great

(332), and remained under Macedonian rule till 30, when it was conquered by Rome and became prov. of Egypt. Greeks founded famous city of Cyrene, near Egyptian frontier, in 7th cent. B.C.; it became head of district Cyrenaica, over which Ptolemies of Egypt established suzerainty in 322; leadership of African civilization passed from Cyrene to Alexandria; district annexed by Rome, c. 95; revolts quelled in 67, after which it was formed into prov. with Crete; 200,000 Greeks and Romans in Cyrenaica massacred by Jews in time of Trajan, who laid waste country; consequently Hadrian founded new colony, Adrianopolis, there.

Phœnicians, a Semitic race so named by Greeks, made settlements in N.W. Africa in 3rd millennium B.C. Utica, their early cap., was flourishing c. 2,000 and CARTHAGE ('New Town') was built towards close of 9th cent. B.C.; opposed Gr. commercial and colonial encroachment; aided Persians, but received defeat by Gelo at Himera, 480; won hegemony over N. African tribes about this time; made treaties in 4th cent. with Rome, which recognized Carthaginian rule in Libya and Sardinia; first Punic War, 264-241, by which Carthage lost Sicily; Rome established suzerainty by second Punic War, 218-201; third Punic War, 149-146, resulted in destruction of Carthage and formation of Roman prov. of Africa in 146. W. of the Carthaginian state were nomad Ethiopian settlement of Numidia (now Algeria), whose monarchs claimed descent from Hercules, and, W. of Numidia, the nomad state of Mauretania (now Morocco); eastern Numidia was annexed by Rome and named Africa Nova (46), but Mauretania remained independent; habit grew of calling all N. Africans *Mauri* or Moors.

NORTH AFRICA.—The history of northern Africa can now for several centuries be divided into periods of rule by different conquerors

(1) *Roman Rule.*—The African prov. was governed by a prætor or pro-prætor; after establishment of New Africa, a proconsul governed both countries; Cagliula divided them, A.D. 37, giving charge of frontier harassed by Moors to *legatus pro prælores* and leaving E. with proconsul; district formed into four provinces by Diocletian under governors of different standing; these four, with Mauretania Sitifensis and Mauretania Casariensis, became diocese of Africa under rule of legate of prætorian prefect of Italy; most completely Romanized of all Roman provinces; Christianized; large cities were heads of many bishoprics and produced famous fathers, Tertullian, Augustine, etc., who moulded Latin Christianity, and philosophers

such as Apuleius; home of numerous sects which split early Church; notorious also for luxury and vice.

(2) N. Africa was easily conquered by Vandals, who landed in great numbers, 429; treaty by which only Mauretania and western Numidia remained to Rome, 442; invaders hated as Arians, never fused with conquered, and were finally overthrown by E. Roman (Byzantine) armies under Belisarius, 534; prov. placed under prætorian prefect, who was also *magister militum*.

(3) *Arabian Rule.*—Egypt conquered, 641, by Mohammedans, who drove Byzantines from N. Africa by end of cent. and extended empire into Spain, 712; they were absorbed by conquered population and made permanent home; many Berbers remained distinct, accepted Mohammedanism, and became rivals of Arabs; conquest of Spain largely due to Arabized Berbers, and Mauretania (Morocco) shared in brilliant Moorish civilization of Spain; invaders were nomads, and pressed farther S. than Romans had done, trading with Sudan. Arab empire soon broke up; Morocco, preponderatingly Berber, became separate Arab state with capital at Fez (founded 806), and other districts followed; reunited under Zeirites of Egypt at close of 10th cent., but there were frequent risings, especially of Morocco. Normans captured coast-line from Cape Bon to Tripoli, 1146-48, but all Christian inhabitants were expelled, 1159; Tunis became finally independent, 1206, Tlemcen (nucleus of future Algeria) 1248, Morocco 1269; Christian crusaders repelled by fleets of these 'Barbary states' until 16th cent.; capitulation of Granada to Spain, 1491, led to great influx of Moors, who continued war from their new homes and were punished by Span. invasions; Algiers and Tripoli were conquered by Spain, 1510; Tunis sacked, 1535.

(4) *Turkish Conquest.*—The Turks had already taken from Arabs leadership of Islam and seized many of their states; Egypt fell, 1517, and they subsequently established regencies of Algeria, Tunis, and Tripoli; Morocco continued independent development as purely African state, extending S., 1588, and occupying Timbuktu. N. Africa lost prosperity during Turk. occupation; but Span. inroads were stopped, and Barbary states freely exercised daring piracy until 19th cent.

(5) *French Conquests.*—N. Africa was object of Christian concern from 7th to 19th cent. Napoleon heralded occupation by conquest of Egypt; French invaded Algeria, 1827, subdued prov. after 30 years' fighting, and occupied Tunisia, 1881; in 1904 Britain recog-

nized Fr. pre-eminence in Morocco; Germany refused to do so, but at last followed suit, in return for part of Fr. Congo, 1911; Spain also secured several ports and districts in Morocco. Franco-Turkish Boundary Commission, 1910-11, surveyed western frontier of Tripoli. France has extended influence s. over Sahara, and recently M. Bonnel de Mézières has discovered grave of Major Gordon Laing, who reached Timbuktu, but was murdered there in 1826. Egypt after Napoleonic conquest and Brit. occupation again became a Turk. state and extended S. in eastern Sudan; Britain and France established, 1882, a Dual Control, abolished 1883; since occupied by Great Britain. The Turco-Italian War, 1912, gave Italy Tripoli and Cyrenaica.

CENTRAL AND SOUTH AFRICA.

—The history of the Dark Continent is that of exploration and colonization.

(1) *Egyptian*.—Egyptians had knowledge of Ethiopia; not certain how far they progressed up Nile; expedition sent by Red Sea, c. 1200 B.C., to 'Punt.' Expedition, c. 610 B.C., round African continent remains doubtful.

(2) *Phoenician*.—It is suggested that gold country called *Ophir* in Bible was that of Zambezi; W. coast explored to S. of Sierra Leone.

(3) *Alexandrian*.—Under Ptolemies, Abyssinia was explored; map of Ptolemy the astronomer, c. A.D. 140, shows increased knowledge of E. coast and sources of Nile; he drew the great lakes and the Nile rising in Mountains of the Moon; possibly explorers of that date possessed knowledge lost until late 19th cent.

(4) *Arabs* founded cities in Abyssinia and Sudan, and traded as far as mouth of Zambezi.

(5) *Portuguese*, 1415-1580.—Prince Henry the Navigator captured Ceuta 1415, and Portuguese began to descend W. coast; endowed by Pope with country between Cape Bojador and Indies, 1443, when gold and slave trades began; equator crossed, 1471; Portuguese sovereign assumed title 'lord of Guinea'; first colony, 1482; Congo reached, 1484; Cape of Good Hope doubled by Diaz, 1488; Abyssinia explored by Covillham; Vasco da Gama sailed by Cape to India, 1498; E. coast from Delagoa Bay to Gulf of Aden settled, 1505-20; alleged cession of mining rights by 'Emperor of Monomotapa,' 1630(?), but Port. trade decayed after annexation by Spain, 1580; power destroyed by Arab risings, etc.

(6) *European Powers* to 1876.—First English reached Gold Coast, 1552 Eng. African Co., chartered 1588, sent; several expeditions to Gambia in search

of Timbuktu; British Co. received charter, 1662, Royal African Co., 1672, African Company of Merchants, 1750. Holland established forts on W. coast from 1595, and became deadly rival of all other powers in 17th cent.; chief settlement at Cape Town, 1652; French spread up Senegal; Prussians established forts on W. coast, Austrians on E. Great change brought about at close of 18th cent. by anti-slavery agitation; trade forbidden to Dan. subjects, 1792, to Brit., 1807; quickly abandoned by other powers; Republic of Liberia founded for freed slaves and natives, 1820.

Modern scientific explorations commenced with Bruce's journey up Blue Nile, 1770-2; London 'African Association' (absorbed by Royal Geographical Soc., 1831), founded 1788, sent out Mungo Park, who reached Niger, 1795; the Dutch finally ceded Cape Colony to Britain, 1814; unsuccessful expedition to Congo, 1816; brothers Lander discovered mouth of Niger, 1830; Brit. influence established there; Dutch from Cape Colony founded Transvaal, 1852, Orange Free State, 1854; Natal became separate Brit. colony in 1856. Missionary enterprise started modern 'scramble' for Africa. Burton, Speke, Grant, and Baker found traditional great lakes of interior, 1858-64; but it was David Livingstone who opened up Central Africa, 1849-73, reaching Luabala.

(7) *Partition of Africa* dates from Brussels Conference, 1876. Lead in new development was taken by Leopold II. King of the Belgians, whose name will always be connected with opening up of Congo. Conference resulted in foundation of International African Association; headquarters, Brussels; practically a private enterprise of King Leopold. H. M. Stanley's journey to find Livingstone resulted in his reaching the Congo; sent out by I. A. A. Committee for Exploring the Upper Congo, 1879; established Leopoldville and other stations; Brazza, sent out by French, commenced marking out Fr. stations on Congo, 1880; Portugal revived ancient claim to this region, 1882, and obtained guarantee of part from Britain, 1884; Lord Granville, however, was compelled to repudiate this treaty; international BERLIN CONGRESS resolved upon.

Relation of powers, 1884: France held Algeria and Tunis; France and Germany were attempting to oust Britain on Niger; France won upper, but Britain kept lower, stream. Britain had consolidated rule in S. Africa; Bechuanaland secured, 1884; influence supreme in Nyasaland, Matabeleland, Zanzibar. German African societies founded in the eighteen-seventies concentrated ambitions on Niger and Congo, W. coast

trading stations, and trade with Zanzibar; encroachment in S. Africa; annexation of Angra Pequena, 1884, first important step of Ger. colonization; Ger. protectorate of Togoland and Kamerun established, 1884. Berlin Congress, 1884-5, agreed on: (1) free trade to all nations in Congo basin, on W. coast $2^{\circ} 30' N.$ to $8^{\circ} S.$, on E. coast $5^{\circ} N.$ to $8^{\circ} S.$, on E. coast $5^{\circ} N.$ to Zambezi, and along certain route from Zambezi to Congo. (2) Free navigation of Niger. (3) Occupation to be valid must be effective.

Leopold II. became king of Congo Free State, 1885, and bequeathed it to Belgium, 1899; it was annexed by Belgium, 1908. Portugal on W. and Britain on S. at first disputed present boundary; Belgian aggression to N. resulted in Belgian, Fr., and Brit. struggle for Upper Nile; Germany (in return for concessions in S. Africa) recognized western watershed of Upper Nile as western frontier of Brit. influence, 1890; Leopold II. confirmed this, 1894, in return for leases to which Germany and France objected; France occupied Fashoda, 1898; Egyptian Government, assisted by British, obtained abandonment of Fr. claims, 1899, when boundary between Fr. and Brit. spheres of influence was agreed on; Belgium surrendered lease of Bahr-el-Ghazal, 1906. Growing rivalry of Germany showed itself: secret mission of Peters, 1885, when he founded German E. Africa Co. and annexed Zanzibar with approval of Britain. Britain established colony of British E. Africa, 1888-95, Uganda, 1890; British S. Africa Co. chartered, 1890, for development of territory now known as Rhodesia. After Boer War broke out, 1899, Orange Free State and S. African Republic were annexed (1900) by Britain, becoming Orange River Colony and Transvaal Colony. These two colonies, with Cape of Good Hope and Natal, from UNION OF SOUTH AFRICA under South African Act passed by Parliament (Sept. 20, 1909), the names of constituent provinces standing as Cape of Good Hope, Natal, the Transvaal, and Orange Free State.

Italy established influence over Eritrea and Somaliland, 1870-91; France established colonies of Fr. Somaliland, 1856-87; Brit. Somaliland dates from 1884; Italy forced to recognize Abyssinian independence, 1896. Division of Guinea coast between Portugal, Britain, and France was settled by treaties, 1885, 1886, 1902, 1907; British Royal Niger Co. received charter, 1886; Britain recognized Fr. influence on Upper Niger, 1890; new agreement, 1899, granting concessions to France on Niger; British Southern and Northern Nigeria formed, 1900.

Later Explorations. — After Stanley's travels Central Africa was explored by Hungarian scientist Holub, Keith Johnston, Thomson, the Port. Major Pinto and his assistants (Ivens and Capello), who explored Upper Zambezi (1877-84), and by Ger. expeditions under Pogge and Wissmann (1880-5), which have contributed much to knowledge of sources of Congo; also explored by Giraud 1884, Grenfell 1885, Lemarie 1895-1900. Major Gibbons carried out surveys of upper and middle Zambezi, 1895-1900; district N. of Zambezi and E. of Congo explored by Thomson 1878-84, and Giraud 1882-84.

Equatorial Nile region was explored by Meyer 1887, Teleki and Hohnel 1887-9, Emin Pasha and Dr. Stuhlmann 1891, Götzen 1893-4, Dr. Gregory 1893, Scott Elliot 1893-4, Holey 1896, Wellby 1898-9 — Mackinder 1899, Donaldson Smith 1899-1900, Austin 1899-1901, Johnston 1900, David and Behrens 1903, Whitehouse and Powell-Cotton 1904-6, Major Darley, Lieut. Aymer, Dr. Kirchstein recently. Foucauld explored Morocco, 1883-4, and French sent expeditions from Algeria and Senegal across Sahara to Upper Nigeria, etc., 1887-9 (Binger), 1890-2 (Monteil, Mizon, Crampel), 1896 (Gentil), 1900 (Foureaux) 1903-7 (Lefaut). Brit. commission, under Lieut. Boyd Alexander, crossed from Niger to Nile, 1904-6; his death followed by expedition of Miss M'Leod and Mr. and Mrs. Talbot, 1910-11. Abyssinia, Somaliland etc., were explored by the James brothers 1883. Bottego 1892, Donaldson Smith 1894-5. The African continent was first crossed from s. to n. (Cape to Cairo) by E. S. Grogan, 1898-1900. See also SOUTH AFRICA and articles on separate states.

Africa long remained isolated from great world trade, partly because there was no way of communicating with interior of continent, but also because of unhealthy districts round coasts and inactivity of natives.

Of these drawbacks the first hardly exists any longer, and second has been greatly ameliorated. Progress of civilization has led to increase of trade. Africa's chief resources are: jungle products, such as indiarubber, oil, timber of various kinds, gums, and nuts; fruits; cultivated plants, such as coffee, cotton, sugar, cereals, and tobacco; ivory, hides, wool, ostrich feathers, and other animal products; and minerals, such as gold, diamonds, tin, copper, iron, antimony, phosphates, and lead. Means of communication have improved, and railways have been greatly extended. A trans-continental railway from Cape to Mediterranean is in process of construction (see CAPE TO CAIRO RAILWAY).

Telegraphic system is also well developed.

War in Africa.—Immediately upon outbreak of war in Europe (Aug. 1914) great military activity took place in Africa. On Aug. 7 Brit. force, in conjunction with Fr. force from Dahomey, entered Togoland, the conquest of which was completed three weeks later (see **TOGOLAND, CONQUEST OF**). About Aug. 10 the Germans in S.W. Africa retired inland, and on Sept. 18 *Luderitzbucht* was occupied by the British; but the campaign was suspended by the rebellion in the Union of S. Africa, which was finally quelled by General Botha early in Dec. Meantime, campaign, which lasted eighteen months, had begun in Kamerun, attacks being delivered with varying fortunes N.E., E., and S.E. by Fr. troops; on W. by Brit. troops; and from the sea by an Anglo-French force under Sir Charles Dobell, which on Sept. 27 occupied Duala, the chief port. The conquest was completed by the surrender of Mora on Feb. 18, 1916 (see **KAMERUN, CONQUEST OF**). In E. Africa the Germans acted on the offensive, and desultory fighting continued on the N. and S.W. borders till General Smuts began his campaign in March 1916. Meantime, Egypt had formally become a British protectorate, the Khedive having sided with the Turks (Dec. 1914). Early in 1915 Turkish attempts E. of the Suez Canal were defeated, and later the Senussi were defeated in W. Egypt, and a rebellion quelled in Darfur. The campaign in S.W. Africa had been resumed, on May 12 Windhoek, the Ger. capital, was occupied, and on July 9 the Germans surrendered unconditionally (see **GERMAN S.W. AFRICA, CONQUEST OF**).

S. African troops fought in the E. African campaign, in which, besides the Brit. forces, Belgian and Portuguese took part. On July 7, 1916, the seaport of Tanga was occupied; the main Ger. force was hemmed in along the central railway by the middle of August; but the pursuit, interrupted by rains, was prolonged, and the final surrender did not take place till Nov. 25, 1918, a fortnight after the Armistice.

The former German colonies in Africa were disposed of at the Peace Conference as follows: Togoland was divided between France and Great Britain. The boundary between the two spheres extends from the northwest corner in a general direction southeast and south, terminating not far from the port of Lome. See **TOGOLAND**. Cameroen was also divided between Great Britain and France. A mandate for German East Africa was given to Great Britain, while a mandate for German

Southwest Africa was given to the Union of S. Africa. See **MAP AFRICA**.

AFRICANDER (OR AFRIKANDER) BUND, S. African association (1879) to extend influence of Afrianders—i.e., S. Africans descended from European settlers—and secure an independent S. Africa. Sympathized with Boers (1889-1902). Divided after the Union of S. Africa, which Botha and Smuts supported, but Hertzog and Beyers opposed. Latter party led rebellion of 1914. Afrianderism now a spent force.

AFRICAN METHODIST EPISCOPAL CHURCH. See **METHODISTS**.

AFRICAN SLEEPING SICKNESS. See **SLEEPING SICKNESS**.

AFRIDIS, Afghan and Pathan mountain race commanding Khyber and Kohat passes; formidable rising following Brit. annexation of their territory put down in Tirah campaign, 1897-98.

AFRIKANDER, AFRICANDER, person born in S. Africa of European descent; term sometimes monopolized by Dutch-speaking people of S. Africa.

AGADIR, most southerly port, key to Morocco, N. Africa (30° 26' N., 9° 38' W.); settled by Portuguese (16th cent.), captured by Moors. *Agadir Incident* (July 1911), attempt of Germans to occupy the place by means of gunboat *Panther*, in order to force conversations with France and Spain as to concessions to Germany. British intervened; gunboat withdrawn and arrangement made (Nov. 27) whereby France compensated Germany with 100,000 sq. m. of Fr. Congo; this territory reverted to France at Peace of Versailles (1919). Incident led to clamorous demands for Ger. naval expansion.

AGA KAHN I. (1800-81), descended from royal house of Persia; gov. of Kerman under Shah Fateh Ali, whose jealousy he aroused; fled to India and sought Brit. protection; very helpful to Napier and to Brit. Government, from whom he received large pension.

AGAG, king of Amalekites; conquered by Saul and hewn in pieces by Samuel's order.

AGAMEMNON, king of Mycenae; bro. of Menelaus; *m.* Clytemnestra; commander of Greeks in Trojan War; sacrificed his dau. Iphigenia (*q.v.*); murdered by *Ægisthus* (*q.v.*).

AGANA, OR SAN IGNACIO DE AGANA, fortified cap. of Guam, Ladrones Is. Its port is San Luis de Apra. Pop. 6000.

AGAPE (Gk. 'love'), love feast of the early Church. At first intimately connected, if not identical with the Eucharist, but became quite separate and finally extinct. It is described by Tertullian, Clement of Alexandria, pseudo-Athanasius, and Socrates. Sometimes it degenerated into mere feasting if not debauchery. It was sometimes followed by the Eucharist. In the Georgian and Armenian Churches pagan sacrificial feast was taken over into the Church as an a.

AGARICUS is a genus of fungi, of the sub-class Basidiomycetes, which comprises the mushrooms. It contains numerous species, some edible and some poisonous; among the former are *A. campestris*, the common mushroom; *A. pratensis*, the fairy ring mushroom; and *A. Georgii*, a large mushroom, while the latter includes *A. muscarius*, fly agaric, and *A. voisius*. Plants of this genus grow on rocks, heaths, meadows, and decaying vegetable matter over the whole of Europe; *A. melleus* is most destructive to timber.

AGASSIZ, ALEXANDER (1835-1910), American zoologist and geologist; b. Neuchatel, Switzerland. At the age of fourteen he emigrated to the United States with his father, graduated from Harvard in 1855 and studied at the Lawrence Scientific School, obtaining a B. S. degree there in 1858. Harvard University secured his services as assistant curator of the Museum of Comparative Zoology from 1860 to 1865. In 1873 he became curator, a post he held till 1885. Among his scientific activities were a number of deep sea explorations he undertook for the U. S. Government. He wrote considerably on subjects within his scientific field, including *List of Echinoderms*; *Exploration of Lake Titicaca*; *Three Cruises of the Blake*, a *Contribution to American Thalassography*.

AGATE, siliceous mineral, being variegated chalcedony, occurring in rounded nodules, which are formed in cavities of igneous rocks by the deposition of silica in layers from percolating water. Iron or other oxides may produce red, brown, and other tints. On account of its hardness and the high polish it can take on, a. has been used as an ornamental stone, and for laboratory appliances, such as mortars and pestles and knife edges for delicate balances. The colors of articles for sale are frequently artificially produced.

AGATHA, ST. (b. 251), Christian martyr who resisted the overtures of Prefect Quintilianus sent by Emperor Decius to govern Sicily, and was by

him cruelly tortured and put to death; festival, Feb. 5.

AGATHOCLES (361-289 B.C.); tyrant of Syracuse; made war with Carthage; famous leader of mercenaries.

AGATHON (447-400 B.C.), Athenian tragic poet, rival of Euripides.

AGAVE, genus of tropical and W. Amer. plants, order *Amaryllidaceae*, with fleshy, pointed, spine-margined leaves; they are very slow in attaining maturity and have a panicle of flowers on a tall stem growing from the centre of the leaf rosette. In Mexico sisal hemp is obtained from the leaves of fibrous species, and pulque, a fermented drink, is prepared from the juice of *A. americana* and other species.

AGE, period of time, from birth to given moment, as in stating age of person. Four ages of man: infancy, youth, manhood, old age. Infancy in Eng. law lasts till 14 years of age, though there is distinction between infants under and over 7 years, those under 7 being incapable of committing crime; 25 used to be considered termination of adolescence, now often placed at 28 or 30; old age commences, 55-60; legal majority, 21st birthday.

World has been divided on different systems into periods of time or 'ages'; great historical division in Palaeolithic Neolithic, Bronze, Copper, and Iron ages, the advance to use of iron tools being last step of civilization. Greeks used metallic terms to symbolize moral changes in world since its commencement: Hesiod divided time into Gold Age, or Age of Cronos, time of virtue, happiness, and plenty, to which later ages looked wistfully back; Silver Age when, Zeus having overthrown realm of Cronos, virtue and happiness lost their first splendor; the Brazen Age of Poseidon, wild, turbulent period; the Heroic Age of Homer, from which Hesiod conceived that his own cruel and evil Iron Age had declined. Latin poets wrote much of Golden Age, which they called Age of Saturn.

Time is divided into different geological periods, as Glacial Age, and into zoological periods, as Age of Fishes, following scheme of evolution of animal forms ending with arrival of vertebrates. Chief historical division now used is that of Ancient History and Modern History, but early modern history is generally treated as two periods of Dark and Middle Ages.

AGEN, a city in S.W. France, and cap. of Lot-et-Garonne. The tn. is old and presents a depressing appearance. It carries on a trade in woolen and linen

goods, and is an important railway center. Jasmin, the poet was b. there. Pop. 25,000.

AGENT. An A. is one who is authorized by another to do acts for him and in his name; the person who authorizes him being called the Principal or Constituent. There are many kinds of As., public and private, and they are known by many names, such as broker, bailiff, factor, ambassador, consul, etc. For most transactions other than those of minor importance it is usual for an agent to receive his appointment in writing, and an A. cannot bind his principal by deed otherwise than by a deed. The granting of such instructions is called the granting of 'power of attorney.' An A. acting under a commission *Del credere*, i.e. undertaking to be surety to his principal for the solvency of his principal's customers, is, in these customers' default, held accountable for debt, but in all other cases he is not liable. As a general rule the act of an A. is considered as an act of the principal, and the principal is in general liable for damage occasioned to third persons by the negligence or unskilfulness of his A.

AGESILAUS II. (c. 445-360 B.C.); king of Sparta; reigned forty-one years, a great military commander; defeated Persians in Asia, allied Athenians and Thebans at *Coronea* (394); defeated by Epaminondas at *Maninnea* (362), but saved Sparta.

AGGLOMERATE (geol.), accumulations of coarse volcanic fragments occurring near a crater, consisting of rocks, often weighing many tons, dislodged from its walls, of large ashes and volcanic bombs created by rotation in the air of molten lava. Arthur's Seat, Edinburgh, is an example of a. in Britain. See *VOLCANO*.

AGGLUTINATION, in philology, forming a compound from two distinct roots, (e.g.), cowherd.—Agglutinative Languages, those in which words are formed by aggregation of roots which may be detrited into mere suffixes and prefixes, as A.S. *like* becomes suffix *ly* in Eng. words; Turk. and Santali are perfect examples; different from inflectional languages, in which change of meaning is given by modification of word without additions of another.

AGINCOURT, AZINCOURT (50° 27' N., 2° 9' E.), village, France; here Henry V. of England with small force, mostly archers, defeated Fr. army under d'Albret, Oct. 25, 1415, after three hours' fighting; French suffered heavy losses.

AGIS, name of three or four Spartan kings (V.-III. cent. B.C.). Agis III. (338-331) rebelled against Macedonian supremacy during Alexander the Great's absence. Agis IV. (245-241 B.C.) sought by land and other reforms to save Sparta from impending ruin due to luxury, unequaled distribution of wealth, etc.; thwarted and murdered.

AGNES, ST. (d. 303), according to tradition, Christian maiden (aged 13) of Rom. birth who suffered martyrdom at hands of Prefect Sempronius (during reign of Diocletian) because she refused to marry his heathen son; patron saint of virgins; symbol, a lamb; festival, Jan. 21.

AGNEW, DAVID HAYES (1818-92), Amer. surgeon; during Civil War noted for operations in cases of bullet wounds.

AGNOSTICISM, the belief of those who hold that there is no proof of the existence of a God, and that, if there is a God, His nature is unknowable; the term agnostic was first used by Huxley in 1869; distinguished from *atheism*, which denies God's existence.

AGNUS DEI ('Lamb of God'), figure of lamb bearing cross; discs or cakes of wax, silver, or gold employed by R.O. Church, bearing this figure are so styled; name of prayer in Mass commencing, 'O Lamb of God, that takest away the sins of the world, have mercy upon us.'

AGOULT, MARIE CATHERINE, COMTESSE D (1805-76), Fr. authoress (*nom de plume*, 'Daniel Stern'), friend of Heine, de Vigny, Sainte-Beuve, Chopin, George Sand, and others; became mistress of Franz Liszt, their dau. Cosima afterwards marrying Richard Wagner; author of drama, *Jeanne d'Arc* (1857), and hist. and political works.

AGOUTI (*Dasyprocta aguti*), terrestrial rodents of the size of a rabbit, in tropical America; of nocturnal habits, dwell in forests and are destructive to banana and sugar-cane plantations.

AGRA, a dist. and township, United Provinces, India. The dist. has an area of over 83,000 sq. m. and a pop. of over 35,000,000. Until 1901 it formed one of the 'N.W. Provs.,' but became one of the United Provs. of A. and Oudh on the creation of the N.W. Frontier Prov. A. city, on the Jumna R., 840 m. N.W. of Calcutta, was for 150 years the cap. of the Mogul rulers, but was superseded in 1658 by Delhi as the seat of their gov. It was captured from the Mahrattas by Lord Lake in 1803, and was unsuccessfully besieged for some months during the Mutiny. Its most famous feature is the wonderful Taj Mahal, the marble

tomb built for queen by Shah Jehan, who was also responsible for the other outstanding architectural features of the city, the Moti Masjid, or Pearl Mosque, and the Jama Masjid. At the suburb of Sikandra is the mausoleum of the city's founder, the emperor Akbar.

AGRAM, now **ZAGREB**, cap. of Jugo-Slav. prov. of Croatia, 140 m. by rail N.E. of Fiume. Manufs. chiefly linen, leather, and tobacco. It has a fine Gothic cathedral dating from the eleventh century, and a university. The tm. was considerably damaged by earthquake shocks in 1880. Pop. 60,000.

AGRARIAN LAWS, ancient Rom. laws governing the use of state lands for pasturage or other purposes; purpose was to give every citizen his fair share in the public domain and prevent patricians from monopolizing it. One of most important was the *Licinian law*, introduced by the tribune, Licinius Stolo (367 B.C.), which provided that every Rom. citizen should, by payment of a tax to the public treasury, have the right to graze 100 head of large, or 500 head of small cattle, upon unallotted state lands. A later law, introduced by Tiberius Sempronius Gracchus (q.v.) and known as the *Sempronian law*, provided that every f. of a family should have the right to occupy 500 jugera (acres), and 250 jugera additional for each of his sons. The passing of this law aroused the patricians' jealousy, which resulted in the assassination of Tiberius and his bro. Caius.

AGRARIAN PARTY, Ger. political party, advocating agricultural protection.

AGRICOLA, CNÆUS JULIUS (A.D. 37-93), Rom. soldier and statesman, was distinguished by ability and the integrity of his character. He was elected consul in A.D. 77, after a brilliant career in Britain and other outposts of the empire. From A.D. 78 to 87 he was governor of Britain, where he estab. the Rom. dominion considerably N. of the Forth, defeating the Caledonians under Galgacus in the battle of the Grampians. His fleet sailed round Britain and discovered it to be an island for the first time. His success aroused the jealousy of the emperor Domitian, who recalled him to Rome, where he spent the rest of his life in retirement. The story of his life by his son-in-law Tacitus (trans. Church and Brodribb, 1877) is one of the finest biographies in any language.

AGRICOLA, RODOLPHUS (1443-85), b. near Groningen, Friesland, and d. at Heidelberg. He was educated at Louvain, then went to Paris and Ferrara, where he attended the prelections of

Theodore Gaza on the Gk. language, and also gave lectures on the language and literature of Rome. He visited Rome, returned to Holland, and then went to Heidelberg in 1482. He was a great scholar (his most important work being *De Inventione Dialectica*), a musician, and a painter.

AGRICULTURAL CHEMISTRY. That branch of the science which concerns itself with the composition of the soil, fertilizers and manures, the nutrition of plants and animals, the composition of agricultural products and their value as food. One of the earliest investigators into the relation of the composition of soil to plant growth was Sir Humphrey Davy, who published the result of his researches in 1814. He attached great importance to the presence in the soil of 'humus,' or partially decomposed organic matter, and formed the theory that plants derived the carbon of their structure from it. Liebig, however, showed in 1840 that plants derive their carbon from carbonic acid in the air. Nevertheless, the presence of humus is still held to be of great value in enabling the soil to retain moisture, in improving its physical condition, and in promoting the growth of certain bacteria which are of value in producing substances on which the plant feeds. From the soil the plant derives its nitrogen and its mineral constituents, which include lime, magnesia, potash, soda, iron, silica, chlorides, carbonates, sulphates and phosphates. The most important constituents of a fertilizer are nitrogen, potash and phosphates. The first promotes the growth of leaves and stems, the second of roots, the third of flowers and fruits. The analysis of a fertilizer concerns itself chiefly, therefore, with these three constituents. The analysis of foods concerns itself with the percentage of nitrogenous matter, or proteid, of fat, of carbohydrates (starch and sugar) and of fibre. One of the most important branches of agricultural chemistry is the investigation of the effect of certain feeding stuffs upon the health and growth of an animal, or in the case of cows or hens, of their output in milk or eggs.

AGRICULTURAL EDUCATION. This phase of education has received much attention, especially during recent years. Most of the agricultural states maintain schools of agriculture and all the State colleges and universities under State control, as well as many of the private colleges and universities have departments for training in agriculture. All phases of agricultural industry and theory are taught in these departments. The Association of American Colleges

and Experiment Stations exercises general control and supervision of the instruction in the United States. The Government also maintains experiment stations in many parts of the continent and in the dependencies of the United States. Experiment stations are also carried on in most of the agricultural colleges and universities, and research and experiment carried on in these stations has resulted in great benefit to agriculture. Model farms are maintained, in many cases, in connection with the course of instruction. The United States Government contributes about \$1,500,000 annually for the maintenance of experiment stations, of which there are about 70. Other countries, especially, France and Great Britain have taken forward steps in promoting agricultural education. This work, which was delayed by the World War, was taken up vigorously at its close.

AGRICULTURAL EXTENSION.

The development of this work among the farmers resulted from the creation by the Smith-Lever Act, of 1914, of co-operative extension work by the United States Department of Agriculture and the State agricultural colleges. Its object is to extend among the farmers the principles of economic production and to provide for them new channels of distribution. The work is carried on by the Extension agents who are established in each county. Over 2,000 of these agents are employed. In addition, there are home demonstration agents in over 800 counties, and leaders of boys and girls club work in about 300 counties. There are also over 800 Extension specialists in the various branches of agriculture and home economics sent down from the agricultural colleges to supplement the work of the county agents. In all, over 5,000 persons were engaged in Extension work in 1922-3. The county agents, assisted by the marketing specialists, aided the farm organizations, which have been established under the operation of the Smith-Lever law in the co-operative selling of all kinds of crops and livestock and in the buying of many farm necessities. The work of the agricultural agents has been largely connected with the organization of co-operative enterprises among the farmers. Its activities also include the formation of community enterprises including recreation centers, rest rooms, libraries, reading circles, and day nurseries. Special attention is given to work among the children, with the idea of interesting them in the processes of agriculture. Over 10,000 farmers' institutes are held yearly with a total attendance of over 2,500,000. These

institutes are addressed by lecturers on special subjects. Agricultural Extension work is carried on also in Alaska, Hawaii, Porto Rico, Guam and the Virgin Islands.

Agricultural Extension work has long been carried on in foreign countries, especially in England, France, Belgium, Denmark, Italy and Canada.

AGRICULTURAL IMPLEMENTS AND MACHINERY. See IMPLEMENTS AND MACHINERY. AGRICULTURAL

AGRICULTURAL LEGISLATION.

The serious economic condition of the farmers following the World War made it necessary to give special attention to methods for remedying as much as possible these disadvantages. The conditions were brought about chiefly by the disorganized state of most of the countries of Europe, which, while they were nearly all suffering from diminished agricultural production, were not able to purchase the surplus needed in the United States. There were, in addition, domestic conditions which worked to a disadvantage in the farming communities of the country.

Various measures were introduced in Congress in 1921, 1922 and 1923, all with the purpose of placing the farmer on a more economic foundation. The Emergency Tariff Bill was passed in 1921 but was vetoed by President Wilson. This imposed high duties on various farm products. President Wilson also vetoed a measure providing for the revival of the War Finance Corporation which made large purchases of agricultural products. This, however, was passed over his veto. At the extra session of the 67th Congress in April, 1921, there developed the movement which resulted in the formation by a group of Senators and Representatives, of the so-called agricultural bloc. This consisted of about 20 members of the Senate and many more members of the House. The members of this bloc ignored party lines and centered their activities on the passage of legislation designed to benefit the farmer. Although numerically in the minority, they were able to control and influence much of the legislation formulated by Congress and to bring about the passage of several important measures. On August 15, 1921, a bill was passed regulating the marketing of live-stocks and its products. Under this measure packers engaged in interstate commerce are prohibited from unfair or deceptive practices and from controlling prices or otherwise creating a monopoly. An Emergency Tariff Law, signed by President Harding on May 27, 1921, imposed high duties on a number of farm products.

AGRICULTURE

The War Finance Corporation of 1918 was amended in August, 1921, with a view to assisting producers of, and dealers in agricultural products, for providing special credit facilities in foreign markets. Another credit measure authorized additional deposits by the Secretary of the Treasury in the Federal land banks to provide a larger working capital for loans.

The leaders of the agricultural bloc in 1922 succeeded in influencing the passage of a law to provide for a representative of agriculture on the Federal Reserve Board. Measures to provide rural credits were introduced in the same year, but were not passed until 1923.

A law was also enacted by Congress in 1922, which brought the various grain future exchanges under the Supervision of the Department of Agriculture.

In foreign countries legislative bodies also passed measures affecting agriculture. In Great Britain the Agricultural Act of 1920 came into operation on January 1, 1921. This measure was intended to make permanent many of the war time provisions of the Corn Production Act of 1917 which guaranteed prices for wheat and oats, the regulation of farm wages, and the enforcement of the proper elevation of lands. This measure, however, was largely repealed in October, 1921. Systems of land reform went into effect in Greece, Mexico, Poland and Portugal.

AGRICULTURE, in its simplest terms, is the efforts of man to produce artificially the most propitious conditions for the growth of those plants and animals which supply his wants. It has been generally referred to as the 'most ancient of human industries.' In a savage state man gathers fruit, nuts and plants growing in a wild state, and hunts wild animals. Such a source of supply, naturally, continues limited, and until his intelligence develops to that degree where he can assist nature in increasing this supply, man continues a savage, his numbers limited by the natural supply. Eventually his intelligence responds to his needs, and he begins to clear ground and to plant the seeds of those plants and trees which supply his needs. The domestication of animals follows, or, perhaps, precedes artificial planting. With increased supply, there is an increase of population, and thus powerful nations develop, advancing in civilization with their progress in their methods of agriculture. It is not, however, always a question of the higher intelligence of a people which measures their adoption of agriculture as an industry. The physical

AGRICULTURE

features and climate of their habitat is also a determining factor. People living in the basin of a great river, with a long warm season, will find natural conditions favoring their first efforts at agriculture. Simple devices for diverting the water over the fertile but dry land beyond the immediate banks are easily invented, and the area yielding natural grains and fruits is widened. The elimination of obnoxious growth follows, then the artificial stirring up of the soil by means of a primitive plow is resorted to. Thus two and three crops a season are harvested, and with the increase of food supply, follows increase of population. Thus it is that we find the first civilizations of antiquity, the first mighty nations, developing along the banks of such rivers as the Nile, the Tigris, the Euphrates, the Indus and the rivers of China. Unfortunately for the futures of these great nations, they adopted systems of agriculture which were incompatible with the development beyond a certain point. Vast tracts of land were acquired by the individuals of the aristocracy, and the land itself was tilled by slaves and, later, in European countries, by serfs. Such a system retards progress, not only in agriculture itself, through the lack of interest in the workers themselves to devise new methods, but in civilization, because of the low cultural state of the masses. Thus we find real culture beginning only in those countries where a race of freehold peasants, or farmers, have the opportunity to develop, and this has usually been in those countries where the qualities of the hardy pioneer were essential in reclaiming lands from their wild states, as in Scandinavia, northern Germany and, at a later period, America and Australia. Thus it was that even the remarkable civilization of ancient Greece proved ephemeral. The aristocrats, living idly from the labor of the helots on their estates, were the only ones possessed of intelligence and culture, while the mass of the people remained sodden with agricultural labor, uninterested in their social environment. In time of great social crisis, such a population would fail to meet the emergency, and thus the top would sink with the decay of the foundations. In northern Europe this system was also adopted, but to a less rigorous degree. The villains of the soil were in a sense slaves, but were not subjected to the humiliating servitude of the slave rated as mere chattel. He had only to yield a certain amount of agricultural wealth to the lord of the domain, and the rest of his time he could devote to his own land. Thus the self interest

of the freeholder was not quite absent. The spark of initiative was not absolutely quenched. Gradually the conflict between the centralized royal governments and the local barons and lords resulted in growing freedom for the serfs, whose interests the kings fostered, that they might have their support in their foreign wars. With this freedom followed popular development and culture, on which the real strength of nations must be based and on which must rest above all, the prosperity of a people.

AMERICAN AGRICULTURE, fortunately for the future of the country, began under conditions which made the slave and serf system unprofitable. It is true that in the southern colonies agriculture was carried on by means of slaves and indentured servants, who were practically slaves during their terms of service, but differing conditions in the north and the west eventually developed along divergent lines and eventually swamped the slave system out of existence. These differing conditions were in that there was much land and little labor. Also, in the New England colonies the land was rugged and not very fertile. While crops were grown in the South for profit, in the north farming was carried on for a mere living, for subsistence, and this in itself was an obstacle to profitable slavery. To the westward lay the wide stretches of virgin lands. When the farmer had extracted half a dozen crops from his land, he found it more profitable to move westward, rather than to resort to fertilization. He plunged into the wilderness and, in isolation, laid out a new farm, exclusively his. This was as true of the South as of the North; the indentured servant, having gained his freedom after serving his term of years, found no inducement in remaining in the employment of his old master, when he could acquire land of his own, merely by traveling westward. Thus a freehold system developed of itself. These conditions may be said to have continued until within comparatively recent times, until the eighth decade of last century, and they set their indelible stamp on the character of American agriculture. Thus to-day we have a race of independent farmers, instead of a peasantry. The westward migration became much more rapid after the vanguard of the advancing settlers reached the level plains of our prairie country. Here there were no stones or trees to be cleared; the land stood ready for the plow. This phase of newer stimulation may be said to have begun at about the time of the Civil War, by which it was momentarily checked.

The effects were felt now in the districts far east, along the coast, especially in the New England states. The men with initiative and energy abandoned their ancestral homesteads and migrated westward. Labor became scarcer than ever, even in the oldest settlements. The conditions created by much land and little labor became more emphasized. Men farmed with their own hands; outside their own families, they could not depend on additional labor. This led to *extensive* agriculture, in contrast to the *intensive* agriculture of the older countries. And this is a characteristic of American agriculture surviving to this day, though now becoming somewhat modified, especially in Eastern communities, around the centers of large, industrial populations. We have raised less food stuffs per acre than any other country in the world. But we have raised more food stuffs per man than any of the other countries. This latter fact has been due to the stimulation of invention in agricultural implements, by means of which one man could accomplish more with his own hands than many a European landowner with an estate worked by semi-slaves. The first notable invention of this kind was the cotton gin, making of cotton a cheaper article for clothing than wool, thereby increasing the demand. Later followed the reaper and the harvester, the mower, the thrasher, the corn planter and the cultivator, the earlier of these inventions coming into wide use during the Civil War, when labor was scarcer than ever, on account of the demands made on the younger men by military service. After the War, and after the perfecting of most of these labor-saving devices, began the real settlement of the vast tracts to the westward. The onward march was continuous. The settler who took up land in Nebraska remained only a few years, till the need of fertilization became manifest. Then he moved onward again, to virgin soil. Literally the settlers ripped the fertility out of the soil, threw it aside and went onward. There were big gains to the man with energy and industrious habits, though he had only his own labor to depend upon. It was during this epoch that the emigration from Europe rose by leaps and bounds, largely from the northern countries, whose people had the energy and industry to respond. It was not till the early eighties that this onward sweeping tide finally reached the western shores of the continent. But then began a new epoch, the beginning of reorganization. This last phase of American agriculture may be said to have begun with 1890. From

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ally since the Great War; and that is the marketing of the produce. More and more conditions have been approaching those of the older countries; the farmers' crops have been shrinking in their purchasing value. The great demands for food stuffs by the armies and the civil populations of the Allied countries during the Great War temporarily checked that tendency, only to be followed by a more marked period of deflation beginning in 1920. The solution to the marketing problem has been found to be in the formation of agricultural co-operative associations, and the third decade of the twentieth century is, and will continue to be, essentially a period of farm organization. Already before the war the orange and lemon growers of California and Florida, the apple growers of the far Northwest and the cotton growers of the South had demonstrated the efficacy of combination. The poultrymen of Petaluma, California, during 1922-23, though comparatively few in numbers and output, have developed such economic strength that they have been able to crowd out the products of the Eastern poultrymen in the New York market. Among the grain growers 1922 was a year of tremendous activity, promising the perfecting of a close combine within the following few years, whereby prices would be maintained. By the end of the decade there is every probability that there will be no branch of American agriculture not closely organized, standing as a unit in the marketing of its product.

AGRICULTURE, UNITED STATES DEPARTMENT OF, an executive department of the Federal Government, the chief of which, the Secretary of Agriculture, is a member of the Cabinet. It was formed in 1889, under the administration of Grover Cleveland, its first Secretary being Norman J. Colman, of Missouri. As specified in the statute creating it, its purpose is 'to acquire and diffuse among the people of the United States useful information on subjects connected with agriculture, in the most general and comprehensive sense of the word.' The Secretary also has under his jurisdiction the supervision of all public business relating to agriculture and the national forest reserves; he has the power to exclude the importation into the country of noxious or diseased animals and the enforcement of the laws forbidding the inter-state transportation of game killed in violation of the various state laws. The Secretary in 1923 was Henry C. Wallace, of Iowa. The appropriation for the activities of the Department in 1922 were nearly \$24,000,000.

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AGRIGENTUM (37° 20' N., 13° 40' E.), ancient town, Sicily; founded by Gk. colonists from Gela, c. 582 B.C.; quickly rose in importance; had many famous buildings, including temple to Jupiter, of which ruins remain; ruled by tyrants, Phalaris (*q.v.*), and Theron (488-472); latter's s. Thrasydæus banished 472 B.C. when democracy established; destroyed by Carthage, 405 B.C.; recolonized by Timoleon, 338 B.C.; sacked by Romans, 261, Carthaginians, 225; again by Romans, 210 B.C.; henceforth subject of Rome; held by Saracens, 828-1086; birthplace of Empedocles; modern Girgenti (*q.v.*).

AGRIMONY (*Agrimonia*) genus of perennial herbs order *Rosaceae*, with yellow flowers and fruits with bristly hooked hairs causing them to adhere to, and be transported by, animals. The name has also been applied to several unrelated plants.

AGRIPPA, sceptic who lived after the age of Cicero; went so far as to dispute the evidence of all truth whatsoever.

AGRIPPA, HEROD, see **HEROD**.

AGRIPPA, MARCUS VIPSANIUS (63-12 B.C.), Rom. soldier, statesman, and patron of arts; favorite of Emperor Augustus, whose dau. Julia he *m.*; served with distinction at *Actium* and elsewhere; had Roman Pantheon built.

AGRIPPINA, THE ELDER (*d.* 33), dau. of M. V. Agrippa (*q.v.*) and Julia; wife of Germanicus (*q.v.*); exiled by Emperor Tiberius, and starved to death; of high moral character; mother of Caligula.

AGRIPPINA, THE YOUNGER (*d.* 59 A.D.), mother of Nero; poisoned her third husband, Emperor Claudius (*q.v.*), to secure throne for Nero, who eventually, resenting her domination, had her murdered.

AGUADA (18° 20' N., 66° 10' W.), seaport, Porto Rica; coffee.

AGUADILLA (18° 31' N., 67° 43' W.), town, Porto Rica. Pop. 8000.

AGUAS CALIENTES, tn. and state, Mexico, so called from hot springs in the vicinity. The tn., 270 m. N.W. of Mexico city, has a considerable trade, and is noted for its beautiful fruit gardens and fine climate. Pop. 45,000.

AGUE (Fr. *aigu*, sharp), a term applied to malarial fever, particularly to the variety in which a paroxysm of intense chill, causing shivering and chattering of the teeth, alternates with a hot stage, when the face is flushed and

the skin hot to the touch. The cause is infection by a parasite associated with the mosquito, and the treatment consists of the use of quinine. See **MALARIA**.

AGUILAR, GRACE (1816-47), novelist and Jewish historian, b. at Hackney of Jewish parents. Her chief works are: *The Spirit of Judaism*, 1842; *The Jewish Faith*, 1845; *The Women of Israel*, 1845; and the famous novel *Home Influence*, 1847.

AGUINALDO, EMILIO (*d.* 1870). Filipino revolutionary leader. At the outbreak of the 1896 rising he was Mayor of Cavite Viejo, but in consequence of the part he took in the rebellion, consented to go into exile at Hong Kong. He returned in 1898 to aid the United States against Spain, but turned against them on their purchase and annexation of the islands, and attacked Manila in Feb. 1899. Fighting continued with varying success till March 1901, when A. was captured by General Funston at Palawan. He swore allegiance to the United States the next month.

AHAB (c. 918-896 B.C.), king of Israel; *m.* Jezebel, dau. of king of Sidon, and by her influence introduced worship of Baal, priests of which were reprov'd by Elijah; killed by arrow in war with Syria.

AHASUERUS, 1. The traditional name of the wandering Jew. 2. The name of several Persian kings mentioned in the Bible, of whom the best known, the husband of Esther, has been identified with Xerxes. The name is probably a title.

AHAZ, king of Judah (741-c. 724 B.C.); Jerusalem being besieged, he called in aid of king of Assyria, who forced him to do homage and pay tribute.

AHMED I., Sultan of Turkey (1603-17).—**AHMED II.**, Sultan (1691-95).—**AHMED III.**, Sultan (1703-30); wars with Russia, Venice, Austria, and Persia; deposed.

AHMED, MIRZA (1898-), Shah of Persia. Upon the abdication of his father, Mohammed Ali as Shah in 1909, he succeeded to the throne, but for some years, owing to his extreme youth, did not take any part in his country's government, to the extent to which his prescribed powers would permit him, under the changed political conditions that have prevailed in Persia of late years. He was crowned in 1914, when in his sixteenth year, reigning without ruling, the administration being controlled by the Persian cabinet.

AHMEDNAGAR

He visited European countries, including France, in 1920.

AHMEDNAGAR (dist.; Bombay, India cereals, indigo. Pop. 840,000. City (19° 7' N., 74° 45' E.); mission station; carpets, Saris (women's dresses), copper and brass vessels. During Great War an internment camp for Germans was about 1 m. E. Pop. 45,000.

AHMEDPUR (29° 10' N.; 71° 15' E.), Bahawalpur State, India. Pop. ca. 30,000.

AI (Heb.; heap); a Canaanitish city E. of Bethel. Abraham pitched his tent between Bethel and Ai (Gen. xii. and xiii.), but the city is better known for its capture by Joshua in later times (Joshua vii. and viii.). Its ruins existed in the time of Eusebius and Jerome, but none are now to be found.

AICARD, VICTOR FRANCOIS JEAN (1848-), Fr. poet, novelist, and dramatist; b. Toulon; *Le Pere Lebonnard*, 1890; some of his poems crowned by the Academy.

AIDE, CHARLES HAMILTON (1830-1906), the son of an American who married the daughter of Sir George Collier, b. at Paris and entered the British army in 1845. As a poet he pub. *Eleonore*, 1856, and *Songs without Music*, 1882. His novels, which paint the polite society with vigor and fidelity, include *Rita*, 1859; *The Marstones*, 1868; *Passages in the Life of a Lady*, 1887.

AIDE-DE-CAMP (Fr.), fixed officer on personal staff of commander, also acts as sec.; post of *aide* to king is generally conferred for distinguished military service.

AIGRETTE, the tufted plumes of the egret, used as ornaments for head-dresses and the like; the name egret includes the various herons on which such plumes grow in the breeding season.

AIQUES-MORTES (43° 34' N.; 4° 11' E.), town in Rhone delta, Gard, France; fine mediaeval ramparts; St. Louis sailed for Crusades from A.-M., 1248 and 1270; now several miles from sea; A.-M. means 'dead waters.' Pop. 4500

AIKEN, co. seat of Aiken co.; S. Carolina, U.S.A., 17 m. E. N. E. of Augusta, Ga.; a health resort chiefly visited by Northerners, and seat of the Immanuel Training School for negroes. Pop. 1920, 4,103.

AIKEN, CHARLES FRANCIS, (1863); professor of theology, and author, b. Boston. Studied at Harvard; St. John's Ecclesiastical Seminary, Brighton, Mass. and Catholic University of America,

AINSWORTH, WILLIAM

Washington; A. B. Harvard; Bachelor. Lector and Doctor of Sacred Theology, Catholic University. Ordained priest; Roman Catholic Church, 1900. Lecturer on apologetics, from 1897 to 1900 at Catholic University, professor since latter year, and dean of the Faculty of Theology, 1909-11. and 1913-15. Notable for his writings on Christianity, *Buddhism*, *Brahmanism*, *Confucianism*, *Hinduism*, and other religious themes, in Catholic Encyclopedia and as a contributor to periodicals of that creed.

AILANTHUS (tree of heaven); genus of East Indian and Chinese tree of the order *Simarubaceae*, with large compound leaves and malodorous greenish flowers. A silk-spinning moth (*Bombyx cynthia*) lives on the leaves.

AILERONS, devices used in the operation of some type of airships for effecting lateral control by altering the angle of incidence in the system of planes either in whole or in part. They are separate small planes, usually placed at the end of the top wing, and are actuated independently of the larger planes, but so connected and interacting with the main lifting surfaces as to be controllable either by the operator or automatically by some form of stabilizer.

AILS CRAIG (55° 15' N.; 5° 7' W.); small precipitous island (1114 ft. high), Firth of Clyde, Scotland; lighthouse.

AINGER, CANON ALFRED (1837-1904), Eng. clergyman and author; master of Temple; canon of Bristol; brilliant preacher; distinguished writer on Charles Lamb.

AINOS, AINU, aborigine race; living in parts of Yezo and Sakhalin, N. Japan; distinct from Japanese whom they probably preceded; short, robust, and hairy; face European rather than Mongolian in type; hunters and fishers; semi-civilized, polygamous; dying out; number 15,000-20,000.

AINSWORTH, FREDERICK CRAYTON (1852), retired major general (U. S. A.), b. Woodstock, Vt., Sept. 11, 1852. Entered medical service of army, 1874, after obtaining M. D. degree from the Medical College of New York University, becoming surgeon major, colonel, brigadier-general and major general. Also chief of Record and Pension office (1892) and adjutant-general (1907). Retired in 1912.

AINSWORTH, WILLIAM NEWMAN (1872), Methodist Episcopal bishop, b. Camilla, Ga. A. B. and D. D., Emory College, Ga., D. D. University

AINSWORTH, WILLIAM

of Georgia; LL.D., Baylor University. Ordained as minister of the Methodist Episcopal Church, 1893 and served as pastor of various churches in Georgia, to 1918, when he was elected bishop (Southern diocese).

AINSWORTH, WILLIAM HARRISON (1805-82), Eng. novelist; b. Manchester; wrote about forty novels (hist. and antiquarian), which acquired immense vogue and made their author formidable rival to Dickens; little read now; his style is often stilted and artificial.

AINTAB (37° 2' N.; 87° 25' E.), town, Aleppo, N. Syria; noted for bazaars. Pop. 45,000.

AIR, the atmosphere we breathe (see ATMOSPHERE); the characteristic or soprano part of a musical composition (see MUSIC, MELODY); the bearing or manner of a person; in the plural, affected manners.

Up to the middle of the eighteenth century A. was thought to be a simple elementary substance, of which all other gases were modifications. Hence oxygen was first of all spoken of as 'dephlogisticated A.,' nitrogen as 'phlogisticated A.,' hydrogen as 'inflammable A.,' and carbon dioxide as 'fixed A.' The idea of modifications of the atmosphere is still preserved in the use of such terms as 'mountain A.,' 'sea A.,' etc.

A. is now known to be a mixture of gases, consisting approximately of four volumes of nitrogen to one of oxygen, with smaller quantities of carbon dioxide, water vapor, argon, ammonia, dust, sulphuric acid, etc.

A. may be liquefied and even solidified by the application of great pressure combined with an extremely low temperature (see LIQUID GASES). Compressed A. is used as a curative agent, as an explosive or propellant, as a dielectric in a form of *Leyden Jar* (q.v.), and as a motive power in various forms of machinery, such as the boring machines used in tunnelling through the Alps and elsewhere (see TUNNELS).

AIRE (48° 43' N., 0° 20' W.), cathedral town, Landes, France. Alarc's capital.

AIR BRAKE. See BRAKE.

AIR MAIL SERVICE. In 1910-20 the United States Government inaugurated the Aerial Mail Service. For this purpose there were used airplanes which had been constructed for war service. The services inaugurated by the trans-continental mail flight, on September 8, 1920, between New York and San Francisco, was followed by the establishment of lines between New

AINNE BATTLES

York and Atlanta, Pittsburgh and St. Louis, and New York and Chicago. The service was successfully maintained and the flights were made without serious accident. It continued to improve during 1921 and the efficiency of the route became recognized as a model for civilian aerial transport. Air mail during this year completed a wireless communication system with 14 stations having radio plants, 3 operated by the Navy Department and the others by the Air Mail Service. In February, 1921, a continuous flight of night flying was made between San Francisco and New York.

During the year nearly 400,000 miles were flown with mail on regular schedule. Up to July 1, 1922, the air mail service had covered with mail, 1,537,927 miles, which carried 1,224,728 pounds of mail, with 48,983,928 letters. The cost of the service was \$1,215,167.

AIRPLANE. See AERONAUTICS.

AIR PUMPS. See PNEUMATIC TOOLS.

AIR SERVICE. See ARMY, U.S.

AINNE, BATTLES OF THE. (1) Sept. 12-18, 1914. After their defeat at the battle of the Marne, the Ger. 1st and 2nd Armies (von Kluck and von Bulow) fell back to the N. bank of the Aisne, where it was soon evident that they intended to remain. On the 12th, Brit. and Fr. forces proceeded to reconnoitre, and on the following day attempted to cross the river. On the left the 6th Fr. Army (Maunoury's) constructed pontoons, chiefly at Vic and Fontenoy, under a heavy fire, and several divisions were got over. The 3rd Brit. Corps attempted the section between Soissons and Venizel. The river was in high flood, and on their left a heavy pontoon bridge was destroyed by the fire of the Ger. howitzers. The 11th Brigade, however, got across, and the remainder of the 4th Division succeeded in passing near Venizel, co-operating with the left of the 2nd Corps against Chivres and Vregny. Of the latter, most of the 5th Division managed to cross between Venizel and Miszy during the evening and night of the 13th, while the 3rd Division was held up about Vailly. Farther E. the 1st Corps was more successful and crossed, with little difficulty, pushing on to Moullins and Palesy. The 5th Fr. Army (Franchet d'Esperey's) meanwhile crossed E. of Bourg. On the 14th a general advance began. Maunoury reached the edges of the plateau, along the crest of which runs the famous Chemin des Dames ('Ladies' Way'). There he found himself held. The fate of the Brit. 2nd and 3rd Corps was

much the same. The attack by the 1st Corps, however, Sir John French wrote, 'under the direction and command of Sir Douglas Haig, was of so skilful, bold, and decisive a character that he gained positions which alone have enabled me to maintain my position for more than three weeks of very severe fighting. The line ran from N.E. of Troyon through Chivy to La Cour de Soupir, while the cavalry carried it down to the Soissons road W. of Chavonne, and the French prolonged it in the direction of the Craonne plateau. On the 15th the Germans counter-attacked violently, but at most points, except on the right of the 5th Fr. Army, the ground was held. A lull followed, but on the 17th Maunoury, reinforced, relieved the pressure on the Brit. left. On the 18th the Brit. 1st Corps beat off two more Ger. attacks, but the Craonne escarpment proved too strong for d'Esperey's troops, and the opposing forces settled down in entrenched positions.

(2) April 16 to May 20, 1917. By a great attack on a front of 60 m., from Soissons to Reims, General Nivelle, who had succeeded Joffre in command of the Fr. armies, hoped to clear the Germans out of France. In co-operation, the British began an assault on the Arras sector on April 9, and a week later the French threw themselves upon the enemy, who reeled at many points, but speedily recovered his equilibrium. The plan totally miscarried. To some extent it had been forestalled by the German withdrawal to the Hindenburg Line in February-March; news of it got into the enemy's possession and at the date chosen the weather was most unpropitious. On the first day the French made a little progress on the left, took Hurtebise Farm, an important point on the Chemin des Dames, but failed to gain the Craonne plateau. On the following day they repulsed Ger. counter-attacks, and after desperate fighting stormed Mont sans Nom and Mont Blond on the Moronvilliers massif, N.E. of Reims, but a marked salient resulted. The 'forty-eight hours' within which Nivelle promised success, had expired, but the battle continued. On the 18th they gained further heights on the massif, and in the W. the Ger. third line was penetrated at Vregny and Vailly, but the Ger. guns and machine guns still dominated the Craonne plateau. On the following day the center of the Ladies' Way was in Fr. hands, but the enemy retained the two ends. On the 20th the first phase ended without any great strategical advantage having been gained. During the remainder of April there was spasmodic fighting. The French had taken about 20,000 prisoners and 200 guns, but their losses

had been cruel. Nivelle was superseded by Pétain. In May the battle recommenced, and on the fourth day Craonne was captured, and the French were in possession of practically all the Chemin des Dames. For a fortnight the Germans tried in vain to dislodge them. On the 20th a renewed attack carried the whole of the Moronvilliers massif. The battle died down into trench warfare, its ambitious object unattained.

(3) May 27 to June 18, 1918. As the third of their terrific blows in the first half of the year that were intended to decide the war, the Germans launched an offensive on the Aisne in order to reach the Marne and cut the Fr. lateral communication between Paris and Verdun. They took by surprise the Fr. 6th Army under Maistre and the Brit. 9th Corps, which was 'resting' on the sector from Craonne to Berméricourt. After a short but intense bombardment the enemy advanced to the assault in overwhelming numbers, and the four weak divisions holding the front of the 6th Army were swept away almost at once. By the afternoon they were back at the Aisne; by the evening they were beyond the Vesle. On the right the Brit. divisions fought gallantly, but with their left in the air were compelled to retire, keeping precarious touch with the French towards Fismes on the Vesle. On the 29th Soissons fell, but the French held the high ground S.W. of the town. In the center the Germans continued to thrust into the salient, and by June 1 they were on the Marne between Dormans and Chateau-Thierry. But the Allies flanks held, and the Germans could not flatten out the salient, try as they might. Amer. and Brit. besides Fr. reinforcements, were brought up, and though the Germans on the 9th launched a supplementary attack W. of the Oise, between Montdidier and Noyon, they were everywhere being held, despite spasmodic efforts to break through—the last of them at Reims on the 18th. Gradually the Allies began to take the initiative, and a month later began the great offensive which compelled the Germans to relax their grip on the Marne, and after five months drove them to surrender.

AITKEN, ROBERT GRANT (1864); astronomer, b. Jackson, Cal. Since 1895 astronomer at Lick Observatory. Discoverer of 3,000 double stars since 1899. A.B., A.M., and honorary Sc.D., Williams College; Sc.D., University of the Pacific, where he was formerly professor of mathematics and astronomy. Honored by the French Academy of Sciences, which awarded him (1906) the Lalande prize for his discoveries. Fellow of the

American Association for the Advancement of Science. Author, among other works, of *The Binary Stars*, and contributor to astronomical and other scientific journals.

AITKEN, ROBERT INGERSOLL, 1878, sculptor, b. San Francisco. Studied at the Mark Hopkins Institute of Art (University of California), where he later became professor of sculpture, subsequently pursuing his art in Paris. Distinguished for his many monuments, notably a number in California to the memory of President McKinley; also for his busts, among others of Madam Modjeska, Augustus Thomas, David Warfield, George Bellows, Chief Justice Taft (as President), and Henry Arthur Jones. Received Medal of Honor (gold) for sculpture, Architectural League, New York, (1915) and silver medal, Panama-Pacific International Exposition, where his 'Fountain of the Earth' and 'The Four Elements' attracted wide attention. President, National Sculpture Society; also identified with other art bodies. Commissioned as captain of infantry (306th) U.S.A., in the World War, and assigned to Machine Gun Company.

AIX, AIX EN PROVENCE (43° 31' N., 5° 27' E.), cathedral town, S.E. France; ancient capital of Provence; famous mediaeval univ.; founded by Romans, 123 B.C.; Marius defeated Teutons, 102 B.C.; thermal springs; trades in olive oil. Pop. 30,000.

AIX LA CHAPELLE, see **AACHEN**.

AIX LES BAINS, a tn. in Savoie, France. In the time of the Romans it was called Aquæ Allobrogum, and Aquæ Gratianæ or Domitianæ. It is situated in a healthy valley, and its hot springs attract many visitors. Pop. 10,000.

AJACCIO (43° 55' N.; 8° 44' E.); capital of Corsica, lying on Gulf of A.; classical *Adjacium*; seat of ancient bishopric; birthplace of Napoleon; exports wood, charcoal, wine, fruit, coral, sardines, chiefly to France. Pop. 19,200.

AJALON, the modern Yalo, is mentioned in Biblical history as the scene of Joshua's defeat of the Canaanites, when he made the sun and moon stand still the victory was complete. It was given to the tribe of Dan.

AJAX (1) *the Great*; s. of Telamon, king of Salamis; after Achilles, principal hero of Trojan War; contended with Ulysses for Achilles' arms, and on failure went mad and committed suicide; subject of tragedy by Sophocles. (2) *The Less*; s. of Oileus, king of Locrians; re-

nowned for swiftness of foot; wrecked and drowned on way home, because of outrage on Cassandra.

AJMERE MERWARA (26° 10' N., 74° 40' E.), province, India; capital, Ajmere; area, 2710 sq. miles; cotton, wheat, oil-seeds. Pop. 1921, 495,879.

AKABA, GULF OF (28° 40' N., 35° E.), eastern arm of Red Sea.—Akaba (29° 30' N., 35° 20' E.), town, near head of gulf.

AKALKOT (17° 18' N., 75° 56' E.) native state, India. Pop. 85,000.—Akalkot (17° 31' N., 76° 15' E.), town. Pop. 10,000.

AKBAR (the 'great', his proper name being Jelal-ed-din-Mohammed) was b. at Amarkot in 1542, when his father was fleeing to Persia from Delhi. He was the wisest and greatest of the Mogul emperors. In 1555 his father regained the throne, but died in the same year. A. committed the care of the kingdom to a regent, Bahram Khan. At that time few of the provs. originally subject to the Mogul emperors were in submission, and Bahram reduced many of them. However, he was despotic and cruel, and in 1560 A. took the rule into his own hands. In ten or twelve years he had conquered all India north of the Deccan, and was able to devote himself to administration. His name as a ruler is inseparable from that of his minister, Abul Fazl, who later left an enduring record of the emperor's name in the Akbar Nameh. The pair ruled with wisdom and vigor, repressing vice with a firm hand. Roads were made, and commerce was encouraged in every way.

A.'s reign marks the beginning of a new epoch, and is one of the most important periods in the religious and literary history of India. A. was not firmly attached to the Mohammedan faith, and called for Portuguese missionaries from Goa to explain Christianity to him. Ultimately he adopted an eclectic kind of Deism, while allowing religious liberty to his subjects. He encouraged literature and estab. schools throughout the country.

AKED, CHARLES FREDERIC, (1864) Congregational minister, b. Nottingham, Eng. Pastor, First Congregational Church, Kansas City, Mo., since 1919. Educated in England for the Baptist ministry, in which he was ordained in 1886, his chief pastorates in that denomination being that of Pembroke Chapel, Liverpool (1890-1907), and of the Fifth Avenue Baptist Church, New York City (1907-11), the latter popularly known as the Rockefeller Church. His vigorous preaching and efforts in social

reform during his Liverpool pastorate made his name notable in England, where he was one of the founders of the Passive Resistance League and a vice-president of the United Kingdom Alliance. After resigning his Baptist pastorate in New York he entered the Congregational Church as pastor of the First Congregational Church in San Francisco, 1911-15. His writings include *The Courage of the Coward*, *A Ministry of Reconciliation*, *Mercies New Every Morning*, *Old Events and Modern Meanings*, *The Lord's Prayer*.

À KEMPIS, THOMAS, see **KEMPIS**.

AKENSIDE, MARK (1721-70), Eng. poet and physician; studied theol. and med. at Edinburgh; chief poetical work, *Pleasures of the Imagination*, in blank verse, 1744; stilted, little originality; in later life successful physician.

AKINS, ZÖE (1886), author; b. Humansville, Mo.; unmarried. Began her literary career as a contributor of poems, criticisms and other writings to magazines, including Reedy's Mirror, the Century, Smart Set and the Metropolitan. Later she became a successful dramatist, her best known play being *Deceasee*, produced at the Empire Theater, New York City, 1918. Two other plays, *Daddy's Gone a-Hunting* and *The Varying Shore* were produced in 1921. She also wrote a novel, *Cake Upon the Waters*, 1919.

AKKAD, ACCAD, one of the cities which constituted Nimrod's kingdom of Shinar.—Akkadian, Accadian, inhabitant of Akkad; language of such people.

AKMOLINSK (50° 5' N., 70° E.), province and town, Siberia, Russia. Pop. of province, c. 1,047,000.

AKRON, a city of Ohio, in Summit co., of which it is the county seat. It is on the Baltimore & Ohio, the Erie, the Pennsylvania and other railroads. It is an important industrial city and is the largest rubber manufacturing center in the world. It has also manufactures of automobiles and many other products. It has the largest cereal mills, clay product plants and fishing tackle factory in the United States. There is an excellent school system and it is the seat of Akron Municipal University. The population has increased greatly within the decade. It grew from 69,067 in 1910 to 208,435 in 1920.

AKRON, MUNICIPAL UNIVERSITY OF, a free city institution previously known as Buchtel College. It was founded by John R. Buchtel in Akron,

Ohio, the cornerstone being laid in 1872 by Horace Greeley. The endowment by its founder amounted to \$500,000. In 1913 the Board of Trustees offered the institution as a free gift to the City of Akron, which was accepted, and on January 1, 1914, it was opened as a municipal institution and renamed Akron University. The medical college still retains the name of Buchtel College. The buildings are valued at \$300,000, the Library has about 12,000 volumes. The student enrollment is about 300 and the faculty numbers about 30.

ALABAMA, state, U.S. (30° 15'-35° N., 84° 53'-88° 30' W.); bounded N. Tennessee, E. by Georgia, W. by Mississippi, S. by Florida and Gulf of Mexico. Surface flat, except in N.E., where are Appalachian Mts. Soil of coastal plain sandy; further N., rich black soil gives name to 'Black Prairie,' where cotton is grown. Chief rivers: Alabama, Mobile, Tennessee; coast line, short; one good harbor, Mobile Bay. Climate dry and healthy; rainfall about 60 in. Chief industry agriculture; large quantities of cotton, corn, wheat, oats, potatoes, sugar, tobacco, are produced; chief minerals, iron and coal in rich deposits; gold, silver, lead also found; much timber; manufactures iron, steel, coke, cotton goods, fertilizers, turpentine; resin. Larger rivers, navigable; 5,500 m. of railway. Chief tns. Montgomery (cap.) Mobile, Birmingham. Governed by senate and house of representatives, with governor. School system for whole state introduced, 1854; separate schools for whites and blacks established, 1875; schools kept up by taxation; state univ. and southern univ. (Greensboro); Tuskegee Institute (for negroes), various colleges, normal schools, etc. Area 51,998 sq. m.; pop. 1920, 2,348,174. See MAP, UNITED STATES.

ALABAMA CITY, a city of Alabama, situated in Etowah co., in the northern part of the State. It is served by the Louisville and Nashville, the Alabama Great Southern, the Nashville, the Chattanooga and St. Louis and the Southern railroads. The city has a number of manufacturing plants, including a cotton mill and a steel foundry, and coal is produced in its vicinity. Situated in the midst of a thriving agricultural region, it is a center for farm products. Pop. 1920, 5,422.

ALABAMA RIVER, 315 m. long, rises in the state of Georgia. It flows through Montgomery, the cap. of the state, and unites with the Tombigbee to form the Mobile, a short riv. which flows into Mobile Bay, on which is situated the

tn. of Mobile. It drains the greater part of the state of A.

ALABAMA POLYTECHNIC INSTITUTE, a non-sectarian and co-educational technical school, situated in Auburn, Ala. It was organized in 1873. Its governing official in 1922 was S. Dowell, A.M., LL. D. Professors and instructors then numbered 96 and the student body 1,269. It has a library numbering some 18,000 volumes.

ALABAMA, UNIVERSITY OF, situated in Tuscaloosa, Ala., founded in 1831. Its faculty of professors and instructors, headed by G. H. Denny, LL. D., president, in 1922 numbered 95, and the student body 1633. The university has a Medical School at Mobile affiliated with it.

ALABASTER, name applied to two species of mineral extensively used as a white translucent decorative stone in arch., and for figures, vases, etc. The ancients employed a carbonate of lime deposited from calcareous water for sarcophagi, jars, perfume vases, etc. It is worked chiefly in Egypt and Mexico. At the present day the term is used for a fine-grained variety of gypsum, out of which are carved the figures, clocks, vases, and divers ornaments which are a characteristic feature of the shops in Florence, Pisa, and other Tuscan towns.

ALADDIN, character in *Arabian Nights*, who became possessed of lamp and ring by rubbing which two genii were summoned to do his will.

ALAGOAS: 1. A state of Brazil, bounded on N. and N.W. by Pernambuco, of which it was originally part, on S.W. by Sergipe, and on the S.E. by the Atlantic. It has an area of 22,580 sq. m., and a pop. of about 990,000. The soil is fertile and the country well watered, but agriculture is only sparingly carried on owing to the deadly climate. The chief products are sugar, tobacco, coffee, and cotton. Macello is the cap. 2. Tn. in state of same name, near the coast, on Lake Manguaba. Formerly the cap. of the prov. Pop. 5000.

ALAI MOUNTAINS (39° 55' N.; 72° E.), lofty mts., Central Asia; extension of Tian-Shan mts.

ALAIS, PEACE OF, treaty (1629) by which Richelieu ended Huguenot wars.

ALAJUELA, cap. of prov. of same name, Costa Rica, 12 m. N. of San José. The center of an important coffee and sugar dist., and the headquarters of many revolutionary outbreaks. Pop. 5000.

ALAMEDA, a coextensive city and

township of California, situation on San Francisco Bay in Alameda co., 11 miles E.S.E. of San Francisco. It is served by the Southern Pacific Railroad. It is notable as a popular summer resort, and is also virtually a residential suburb of San Francisco, many of the latter's business men having homes there. Among its manufacturing establishments, which embrace electric light and street railway plants, large potteries, oil refineries and shipbuilding yards, are extensive borax works, said to be the largest in the world. It has a State bank and is the seat of the College of Notre Dame (Roman Catholic). Pop. 1920, 28,806; 1923, 30,759.

ALAMO, THE, a historic structure which was formerly a Mission Church at San Antonio, Texas. During the Texan War for Independence, in 1836, it was occupied by about 150 of the revolutionists. They were attacked by over 4,000 Mexicans under General Santa Ana. In spite of the great odds the defenders held out from February 23 to March 6, when their provisions and ammunitions having been exhausted the Mexicans carried the fortress by storm. Of the seven of the garrison who survived, six were murdered after their surrender. Only one escaped to report the affair. Among those who took part were David Crockett, and Colonel James Bowie, the inventor of the Bowie knife. In the troubles which followed with Mexico along the border, during subsequent years, 'Remember the Alamo' was a favorite war cry.

ALASKAN BOUNDARIES. See ALASKA.

ALARCON, HERNANDO DE (XVI. cent.) Span. navigator; explored coast of California (1540) and constructed correct map of same.

ALARCON Y MENDOZA, JUAN RUIZ DE (d. 1639,) Span. dramatist; b. Mexico; wrote many plays, including *La Verdad Sospechosa* (imitated in Corneille's *Le Menteur*) and *El Tejedor de Segovia*; depreciated by contemporaries, but now recognized as one of greatest Span. dramatists.

ALARIC (d. 410 A.D.), king of the Visigoths; b. near the Danube; made his first appearance as general under Emperor Theodosius in war with Eugenius. After Theodosius' death A. was proclaimed king of the Goths, and his life thereafter is one long chapter of conquests; ravaged Greece, invaded Italy, besieged, captured, and pillaged (410) Rome, the mistress of the world; d. shortly afterwards at Cosenza.

ALARIC II., King of the Visigoths,

484-507. He succeeded Euric to an extensive kingdom, and during most of his reign, was at peace with the Franks. He was a wise and tolerant ruler, and ordered the compilation of the *Breviarium Alaricianum*, a selection from Roman legal writers, for the use of his governors. His prosperity ultimately brought him into conflict with the Frankish king Clovis, who, on a religious pretense, made war upon A., whom he defeated and killed at Poitiers.

ALASKA, a Territory included in the Western Division of the United States. It includes the extremely northwestern part of the American continent. It is bounded on the north by the Arctic Ocean, on the west by the Arctic and Bering Sea, on the south by the North Pacific Ocean, and on the east by Canada. It has a gross area, so far as has been determined, of 590,884 sq. miles, including the Aleutian Islands. Alaska was purchased from Russia in 1867 for \$7,200,000. It was colonized by Russian trappers and Indian traders and was very sparsely populated. The population in 1920 was 54,899, of whom 27,983 were whites and 27,421 Indians and Eskimos.

TOPOGRAPHY. Included within the Territory are the Prince of Wales Island, the Alexander or King George Archipelago, and the Kadiak, Aleutian, Pribilof and St. Lawrence Islands. Alaska is mountainous, with high plateaus. Through the southern part extends the coast range, of which the principal peaks are Mount St. Elias (18,024 feet), Mount Wrangell (14,005 feet), and further inland, Mount McKinley (20,300 feet). The last is the highest peak on the North American continent. There are in this region about a dozen active volcanoes, the most remarkable of which is Mount Katmai, with the so-called 'Valley of 10,000 smokes'. This volcano which had long been dormant, suddenly erupted on June 6, 1912. See **VOLCANOES**. The coast line of Alaska exceeds that of the entire Atlantic seaboard of the United States, and has several important indentations, including Prince William's Sound, Cook Inlet, Bristol Bay and Northern and Kotzebue Sounds. The mainland from north to south in extreme length is about 1,100 miles. Its extreme width is about 800 miles. Its important rivers include the Yukon, which rises in British Columbia, and is about 2,000 miles in total length; the Kuskokwim which empties into the Bering Sea; and the Colville, Copper and Shushitna.

CLIMATE. The climate of Alaska is greatly diversified. In the interior the thermometer often records 60° below zero in winter, while in summer the

temperature sometimes reached 90° above zero. On the coast the thermometer rarely falls below zero in the winter, with a maximum of about 80° in the summer. This is due to the proximity of the Japanese current. Rain on the coast is frequent.

GEOLOGY AND MINERALOGY. The Arctic district is treeless, with ranges of hills. In the Yukon Basin are large areas of forest. The Kuskokwim district has also abundant forests and many mountains. The Aleutian district comprises treeless islands, the Kadiak region is comparatively unexplored, and in the Sitka region are valuable timberlands.

Gold was first discovered on the Kenai peninsula in 1848 but no general search for it was made until 1880, when surface gold was found at Juneau, and systematic mining was begun at that time. The great Klondike rush stimulated interest in gold mining in Alaska in 1896, and large and profitable deposits were found in the Yukon region in the Cape Nome district and on Bering Sea. Gold production reached its maximum in 1909, with \$29,411,716. This fell off to \$3-635,660 in 1920. The decrease was largely due to the exhaustion of the placer mine and to the economic conditions following the World War. Copper in recent years has taken the place of gold as the most important mineral production of Alaska, but this also has shown a gradual decrease from 88,793,400 pounds, valued at \$24,240,598 in 1917, to 70,436,363 pounds valued at \$12,960,106 in 1920. Silver is produced in considerable quantities. Its value in 1919 was \$1,097,000. Lead and tin are also produced, and in small quantities, platinum and quicksilver. The total gold production up to January, 1921, was valued at \$320,000,000, and the copper production at \$127,000,000. The value of the other metals brought the total value up to that time at \$460,000,000. In 1922 the United States Geological Survey estimated the value of the placer gold reserve to be at least \$360,000,000. Coal exists in large quantities in Alaska, but owing to the difficulty of transportation and restricted legislation, coal mining has been little developed. There are also petroleum deposits of great value, but these have not been exploited.

FISHERIES. The most important product of Alaska are those of the fisheries. Of these the most valuable is the salmon. In 1920 the catch of salmon amounted to 4,429,463 cases, valued at \$35,602,800. This, however, was the smallest catch since 1914. This is due to overfishing, predatory enemies, and interference with spawning. Many

other important fish taken are halibut, herring, cod, and whales. The seal fisheries in the Pribiloff Islands are of great value, and the herds have been greatly increased in recent years following restrictive legislation, which prevented the wholesale killing which went on prior to that time. In 1921, 22,546 pelts were taken.

AGRICULTURE. The efforts of the United States Department of Agriculture to develop agriculture in the Territory have had considerable success. There are large areas of land suitable for the raising of crops, both agricultural and horticultural. Nearly all varieties of hardy grains can be grown in Alaska, as well as most hardy fruits and vegetables. The Fairbanks valley produces annually about 4,000 bushels of various grains.

EDUCATION. Schools are maintained for pupils of white or mixed blood, and also for children of the natives. In 1922 provision was made for the establishment of an agricultural and mining institution, which will be the first college in the Territory. The education, mental care and relief of the natives are administered by a special field force of the United States Bureau of Education. This, in 1922, consisted of 6 supervisors, 9 physicians, 13 nurses, and 133 teachers. Hospitals are maintained in four different places. In the 67 native schools instruction is given to over 3,600 pupils in English, domestic science, and the simple forms of industrial art.

COMMERCE. The Alaskan trade has decreased in recent years. In 1919 shipments into the Territory were valued at \$37,554,034; in 1920, \$33,998,462; in 1921, \$27,333,972; and in 1922, \$23,625,161. The export in 1919 amounted to \$72,068,154; in 1920, \$66,498,877; and in 1921, \$54,126,718; 1922, \$36,775,810. The principal falling off in exports were fish and copper. The gold and silver shipments were valued in 1920, at \$8,793,085 and in 1921, at \$7,072,114.

RAILROADS. Congress in 1914, authorized the building of a railroad, not to exceed 1,000 miles in length. When complete this line will connect Seward, the Kenai peninsula, and Chatinika, Tanana Valley, by way of Anchorage Broad Pass, Nenana and Fairbanks, with a branch line into the Matanuska coal field. In 1923 the line was in operation from Seward to Fairbanks, 467 miles, with spurs to coal mines, bringing the total length to 541 miles. The system was completed in 1923. The cost will exceed \$52,000,000.

POPULATION. The population of the Territory in 1920 was 54,899, a decrease of 9,457 since 1910. This decrease was due largely to conspicuous war service

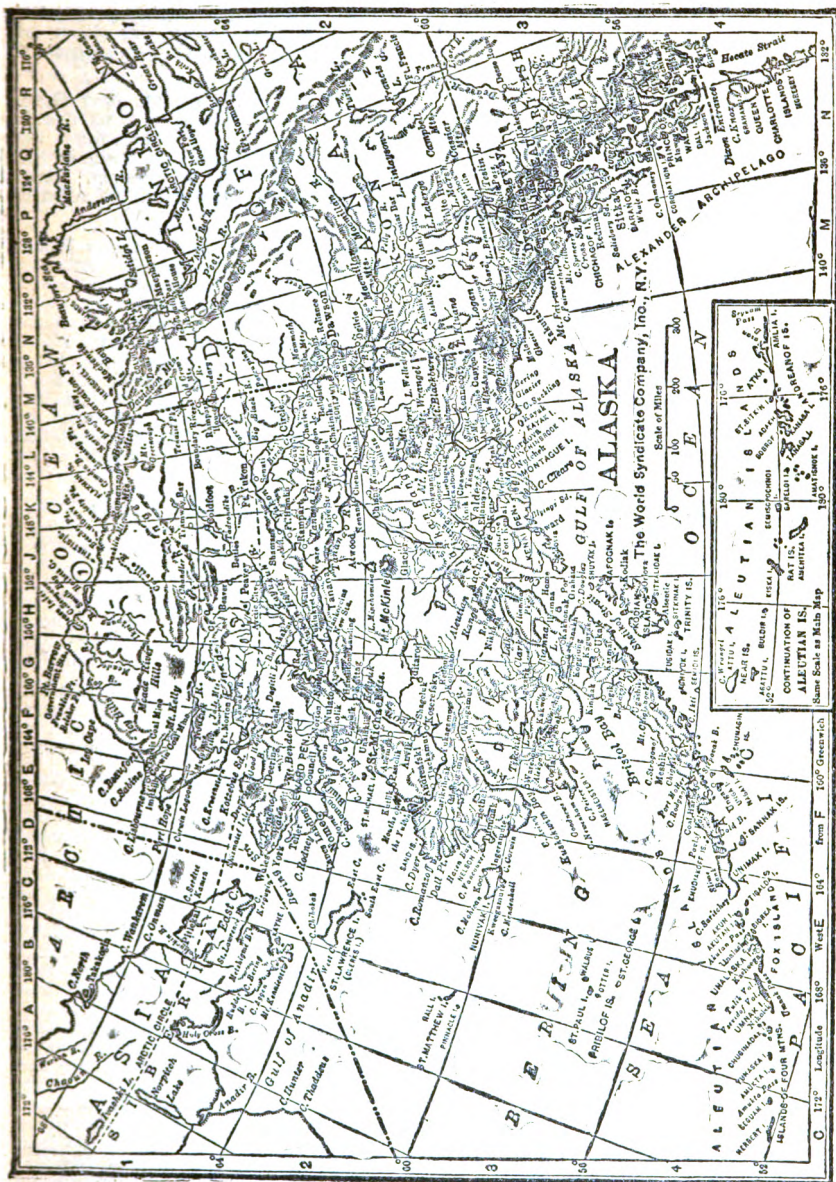
of the men of Alaska who volunteered in larger proportion than in any State. It is due also to the non-production of many mines which are temporarily closed. Chinese, Japanese and negroes have almost entirely disappeared. The mining town lost heavily in population. The white, in 1920, constituted barely half the population. The census revealed a decrease in the native population of 25,321 in 1910, to 20,803 in 1920.

MANUFACTURES. Apart from the industries connected with fisheries and forests, there are a few manufacturing establishments in Alaska. The census of 1920, however, showed a steady increase. The corporations increased from 56 in 1910 to 113 in 1920, while the capital increased from 13 to 65 millions, and the average number of workmen from 3,099 to 6,575.

FORESTRY. The forest resources of Alaska are extremely valuable and are being developed. The sales of timber amount to about 50,000,000 B. M. annually. Pulp mills have been established and the Forest Service has made a combination of the study of pulp making and hydro-electric power in co-operation with the Federal Power Commission.

GOVERNMENT. Up to 1912 Alaska was an unorganized Territory, and was governed directly by Congress. It had no local legislative body. Its officers were appointed by the President. In 1912, however, Congress passed a Civil Government Act creating a Legislature and Assembly, with limited powers. By the terms of this act, Alaska became an organized territory with a Legislature consisting of a Senate of 8 members, 2 from each of the 4 districts, and a House of Representatives, consisting of 16 members, 4 from each judicial district. Senators served 4 years and Representatives 2 years. The Legislature meets every two years. Its powers are limited as it can pass no laws which are inconsistent with the laws already passed by Congress. At its first session the Legislature gave the franchise to women. The executive officers are the Governor, appointed by the President; Secretary of the Treasury; Secretary of the Governor, and a Surveyor General. There are four judicial districts with a center at Juneau, Nome, Valdez and Fairbanks. There is no local government except in towns of 300 or more inhabitants. The Territory is represented in Congress by a delegate.

HISTORY. Alaska was discovered by the famous navigator, Bering, in 1741, and Russian settlements were made at various points southward. By 1772 many trade companies had been established. The Territory was given to a



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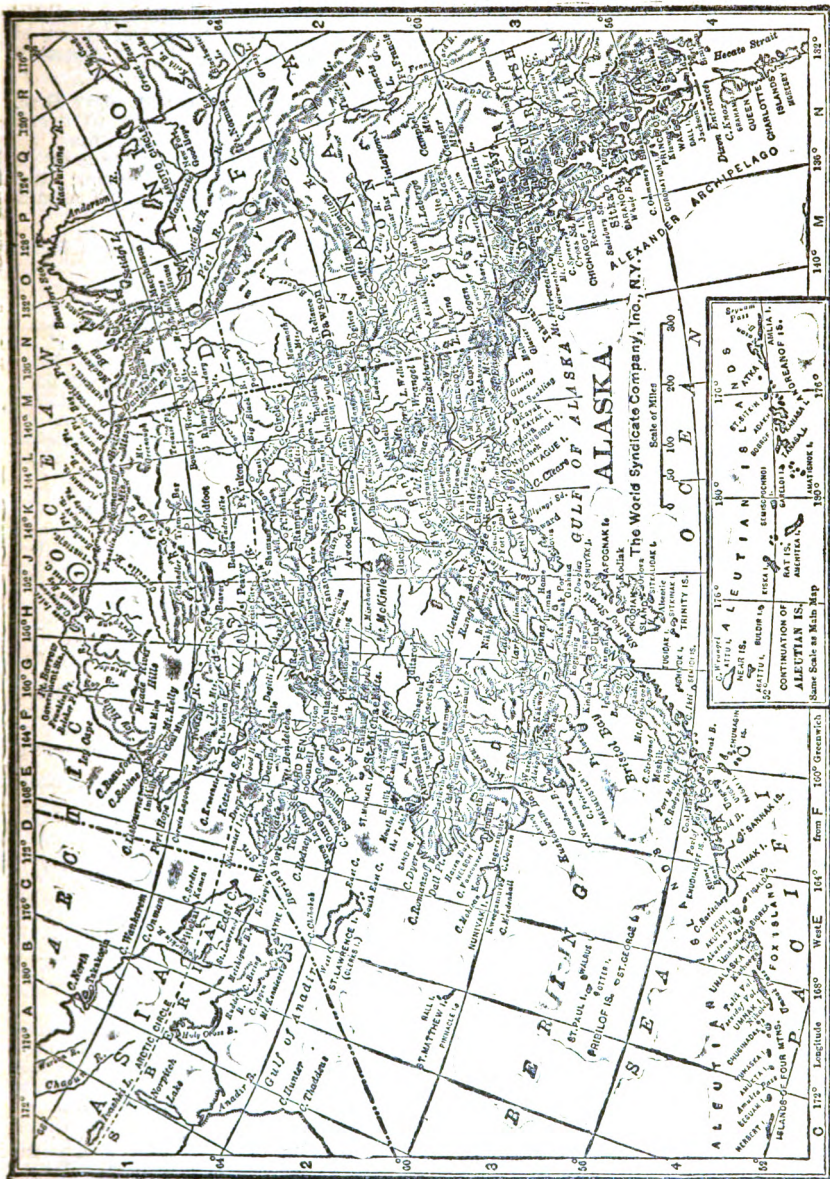
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115°	110°	105°	100°	95°	90°	85°	80°	75°	70°	65°	60°	55°	50°	45°	40°	35°	30°	25°	20°	15°	10°	5°	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	100°	105°	110°	115°	120°	125°	130°	135°	140°	145°	150°	155°	160°	165°	170°	175°	180°	185°	190°	195°	200°	205°	210°	215°	220°	225°	230°	235°	240°	245°	250°	255°	260°	265°	270°	275°	280°	285°	290°	295°	300°	305°	310°	315°	320°	325°	330°	335°	340°	345°	350°	355°	360°
115°	110°	105°	100°	95°	90°	85°	80°	75°	70°	65°	60°	55°	50°	45°	40°	35°	30°	25°	20°	15°	10°	5°	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	100°	105°	110°	115°	120°	125°	130°	135°	140°	145°	150°	155°	160°	165°	170°	175°	180°	185°	190°	195°	200°	205°	210°	215°	220°	225°	230°	235°	240°	245°	250°	255°	260°	265°	270°	275°	280°	285°	290°	295°	300°	305°	310°	315°	320°	325°	330°	335°	340°	345°	350°	355°	360°

Russian company in 1799 by Emperor Paul VIII., and in 1867 became the property of the United States through purchase. The discoveries of gold in the Yukon valley in 1896, and the years following created difficulties in regard to the boundary between Alaska and the British territory in Canada. The dispute was referred to an arbitration tribunal. This body continued its deliberations until 1914. On October 20 of that year the majority of the members of the tribunal voted against the Canadian contentions. By this decision Canada was cut off from the seacoast, north of 54° 40'. In 1910-11 an acute dispute arose in relation to coal lands, as a result of charges that large corporations were attempting to secure control of valuable coal land under laws passed by Congress. As a result of this agitation, R. L. Ballinger, Secretary of the Interior resigned, and his successor, Walter S. Fisher, undertook a thorough investigation of the matter. This led to the reorganization of the regulations relating to the coal fields. At the outbreak of the World War over 3,000 Alaskans enrolled for service. The number was far beyond the quota. 94 per cent of the white population and 1,303 of the natives were enrolled in the Red Cross. Alaska led all the States in the per capita subscription for War Stamps. Following the World War the economic conditions throughout the world paralyzed for a time the resources of the Territory. The conditions were due, however, to some extent, to the methods of government by which Alaskan affairs were in the hands of 33 Federal bureaus. The result was delay in legislation and other constructive conditions. To correct these delays under executive authority, the Federal affairs of Alaska in 1920 were entrusted to the Inter-Departmental Committee. Under its direction matters greatly improved and certain powers were given to local officials by the establishment of Federal officers at Juneau. A thorough investigation was made by a committee of the House of Representatives into the natural resources and public utilities of Alaska, in 1920-1. This report forms the most complete Alaskan information ever collected. The Governor of Alaska in 1921 was Scott C. Bone. The capital is Juneau. See MAP ALASKA.

ALB (Lat. *albus*, white), ecclesiastical vestment, reaching to feet, worn specially at celebrations of Eucharist; generally of white linen, and in Middle Ages often embroidered, but now in Rom. Church generally plain (except in religious orders); revived in England by ritual

movement, and worn under chasuble by celebrating priest, and sometimes by lay servers.

ALBA LONGA (41° 43' N.; 12° 40' E.), ancient Latin town, on shore of Albanus Lacus, near Rome; traces of necropolis remain.

ALBAN, ST. (III cent.); first Brit. martyr; b. at Verulam; put to death during persecution of Christians by Diocletian; church built on scene of his martyrdom by Offa of Mercia, from which the abbey and town of St. Albans arose.

ALBANI, a rich and famous Rom. family, coming originally from Albania and settling at Urbino in the sixteenth century. The fame of the house began with the accession of Giovanni Francesco A. to the papal throne in 1700, since when numerous members have been cardinals and other high church officials. Cardinal Alessandro A. (1692-1779) formed the celebrated art collection at the Villa A. at Rome, which was depleted by the Fr. The family died out in the nineteenth century.

ALBANI, FRANCESCO (1578-1660), Italian painter of the Carracci school, b. at Bologna, and d. there. He painted numerous altar-pieces, but preferred mythological or pastoral subjects. His twelve beautiful children served as models for many of his most famous paintings, now at Rome, Dresden, and in the Louvre. Opened a Rom. academy.

ALBANI, MADAME, NEE MARIE EMMA LA JEUNESSE (1847), Canadian vocalist, of Fr. descent, one of leading operatic and oratorio sopranos.

ALBANIA, country, at present mandatory to Italy, on E. shore of Adriatic Sea (38° 53'-42° 40' N., 19° 18'-21° 12' E.). Traversed by range of high mts.; Metoja, Kosovo, and coast plains fertile. Chief rivers are Drin, Shkumbia, Voina. Largest lake is Soutari. Climate is extreme; fever on swampy coast lands. Wolves in all parts; game abundant. Resources include forests of oak, beech, ash, and other trees; corn, wheat, rice, tobacco, olives, oranges, vines, and mulberries are cultivated; cattle raised; exports fish, salt, cattle, agricultural produce, silk, olive oil, tobacco, valonia, asphalt, skins, etc. Chief towns are Durazzo (cap.), Scutari, Elbasan, Tirana, Argyrocastro (Ergeri), and Valonia.

Albanians are warlike race, descended from anc. Illyrians and Epirotes. Ghegs in the N. are Catholics and Mohammedans; Tosks in the S. Mohammedan and orthodox. They have retained their own language, of which Gheg and Tosk

ALBANO

are principal dialects. Anc. Illyria and Epirus, now included in Albania, were provinces of Byzantine Empire and were frequently ravaged by barbarians. Bulgarians established kingdom in S. in 9th cent. which long resisted emperors of Constantinople. Early in 15th cent., when Turkish aggression began, Albanians offered stout resistance, and under great leader Skender Bey defeated Turkish armies on many occasions. In 1477 Mohammed II. began siege of Scutari, which fell after fifteen months, when treaty was concluded whereby Turk. authority was recognized. Till 1770 history was one of ceaseless warfare, both internal and against Montenegrins. Albania took no part in Russo-Turkish War of 1877-8, nor in Gr. War of Independence. Revolts against Turkey continually took place. Autonomy guaranteed by great powers after Balkan War, 1913, and a German prince, William of Wied, became ruler. During Great War country invaded by neighboring states. At the San Remo Conference (April 1920) the mandate for Albania was given to Italy. Area, c. 4,200 sq. m.; Pop. 300,000.

Early in 1920 a national convention was held at Lushnja, where the foundations for a new government were laid. The new Constitution provided for a Regency Council of Four, two members being Musselmans and two Christians, who were to appoint a Cabinet of heads of departments. A national assembly of 72 members was to be elected by popular suffrage. In February, 1921, elections were held, and in the following December the four Regents were chosen, these being Omer Pasha Vrioni, Refik Toptani, Sotir Peci and Antoine Pistulli, the two latter being the Christian representatives. At the head of the Cabinet was Djaffer Ypi, who assumed office December 22, 1921. During this period the Albanian Government has had constant disputes with Italy, Greece and Yugoslavia over boundaries. On this account open hostilities with Italy broke out in 1920, the Italians occupying Valona in June, 1920. Constant fighting went on until August 2, when a truce was declared, resulting in a treaty whereby Italy renounced most of her claims. During 1922 similar troubles with Yugoslavia brought about invasion by the Yugoslavs, but this was finally adjusted by the League of Nations, of which Albania became a member, in January, 1921. See MAP NEW STATES OF SOUTH EASTERN EUROPE.

ALBANO, the name of a tn., lake, and mt. of Italy. The tn. lies 12 m. S.E. of Rome on the Via Appia, and is celebrated for the beauty of its scenery. The lake

ALBANY

and mt. lie 13 m. S.E. of Rome. The lake is 6 m. in circumference, and the mt. rises a little over 2000 ft. above the lake.

ALBANY, a city of Alabama, situated on the Tennessee river about 30 miles north of Birmingham in Morgan co., and once known as New Decatur. It is served by the Louisville and Nashville railroad. The town has iron works, cottonseed oil plants, lumber yards, railroad repair shops and tanneries, and is developing into an industrial center. Pop. 1920, 7,652.

ALBANY, a city of Georgia, the county seat of Dougherty co., situated at the Flint river. It is an important railroad center, being served by the Central of Georgia, the Atlantic Coast Line, the Seaboard Air Line, the Georgia Southwestern and Gulf, the Georgia Northern and the Albany and Northern. As an industrial community it has plants producing cottonseed oil, bricks and fertilizers, and lumber yards. It is also a cotton center. Its water supply is furnished by artesian wells. Among its chief structures are the public library, Federal building and a monument to Confederate soldiers. For its size the city has shown a marked growth in recent years. Pop. 1910, 8,190; 1920, 11,555.

ALBANY, a city of New York, the capital of the State, and the seat of Albany co. It is on the west bank of the Hudson river, and is about 145 miles north of New York City. Albany is the head of navigation of the Hudson River and is the terminal point of the Erie and Champlain barge canals. From it six railroads radiate to all parts of the country. The Boston and Albany Railroad has its terminal here and it is the ending also of the main lines of the West Shore, the New York Central and the Delaware and Hudson railroads. By river the city has direct communication, by night and day lines, with New York and other points on the Hudson, while communication is had with interior points through the Erie and Champlain canals. As a result of these transit facilities Albany is an important commercial center and is one of the most important express points in the United States. From it many large oil companies, mail order houses and other corporations distribute their products. The city is provided with many features which make it one of the handsomest in the country. There is an extensive park system, including Washington Park of 90 acres, and Lincoln Park of 78 acres. The water and sewer systems are of the latest improved type. There are hospitals, including three general hos-

ALBANY CONGRESS

pitals and a number of special hospitals. The school facilities are unusually good. There are about 25 grammar school buildings and a high school building which cost \$1,000,000. Over 12,000 pupils are housed in these buildings. In addition there are many private and parochial schools. The city has 12 public libraries and a State Library which contains about 525,000 volumes. There are 75 churches, some of them of more than ordinary architectural merit. Among the important public buildings are the State Capitol, city hall, Union Station, the State Education Building, State Library and State Museum. In addition to the industries already noted are the manufacture of car-heating apparatus, stove specialties, writing paper, underwear, locomotives, gas ranges, beds, chemicals, etc. Albany has an assessed valuation of real estate of about \$100,000,000, with a personal valuation of about \$10,000,000. There are many important banks and trust companies.

Albany was first settled in 1614 by a company of Dutch traders who established a station under the name of Fort Nassau, on Castle Island. This was later removed to the mainland. Fort Orange was erected in 1623. The settlement suffered severely from the Indians but grew steadily. It received its present name in 1664 from the Duke of York and Albany, afterwards James II. of England. It was granted a city charter in 1686 and in 1797 became the State capital. The first provisional congress which formed the plan of the proposed union of the colonies had its first meeting here. Pop. 1920, 113,344.

ALBANY CONGRESS, an assembly of the representatives of seven northern colonies, called together by the British Crown, meeting in Albany, N. Y., on June 19, 1754, to discuss measures of protection against the war with France that was then threatening. The colonies represented were New York, Pennsylvania, Maryland, Massachusetts, New Hampshire, Connecticut and Rhode Island. Two main propositions were set forth; first, a league with the Five Nations, which was finally accepted. The second, proposed by Franklin, is of special interest as a prophetic indication of the future. His proposal was that the colonies should form a protective federal union, to be governed by a General Council, the President of which should be appointed by the Crown. The Union should have the power to form and maintain a standing military force, to build forts and to take all such measures as a nation usually employs for protection against foreign invasion.

ALBERT III.

The President should be commander-in-chief of the federal army, should appoint all military and civil officials and should have the power of veto over the elective Council, the latter to consist of the representatives of the separate colonies. The plan was rejected, by the Crown as conferring too much power on the colonies, by the representatives as placing too much power in the hands of the President.

ALBATROSS (*Diomedea*), genus of large sea-birds of the order Tubinares, related to the petrels, occurring in the Southern Ocean. The common a. (*D. exulans*) measures from 10 to 15 ft. between tips of extended wings; one of the most indefatigable flyers known; according to superstition it is unlucky to shoot an a. (cf. *The Ancient Mariner*.)

ALBAY, a city and cap. of the prov. of A. in the Philippine Is. It is one of the most important cities of the Philippine group. Built at the base of Mt. Mayon, it is in the center of one of the great hemp-producing dists. Large quantities of hemp are shipped to Manila; cocoa, sugar, and copra are amongst other products. Pop. 43,000.

ALBEMARLE SOUND, a large inlet on the coast of N. Carolina, about 55 m. long, and with an average width of 10 m. It received its name from the Lord A. who lived in the reign of Charles II.

ALBERONI, GIULIO (1664-1752). Span. cardinal (1717); s. of a gardener; rose to high position in Church and State; Philip V.'s chief minister; sought to revive Spain's power; dismissed (1719) after failure of foreign policy, owing to quadruple alliance (England, France, Austria, Holland).

ALBERT (1490-1545).⁺ Elector of Mainz; abp. of Magdeburg; s. of Elector of Brandenburg; strenuous efforts were made to secure his help for the reformed faith, but he definitely ranged himself on the side of Catholicism; granted power to sell indulgences by Leo X.; generous patron of learning; friend of Erasmus.

ALBERT (1490-1568); last Grand Master of Teutonic Order; 1st Duke of Prussia; very friendly towards Luther, and did much to further his doctrines.

ALBERT I., THE BEAR (1100-70), Margrave of Brandenburg; conducted campaigns against the Wends; did much to further Christianity and civilization.

ALBERT III. (1414-86), Elector of Brandenburg; succ. on abdication of bro. Frederick II.; by his energy and

ambition made himself one of most powerful princes of his time; called the Ger. Achilles or Ulysses.

ALBERT I. (1250-1308), Ger. king (1298); s. of Rudolph I. of Hapsburg; murdered by his nephew, John, whom he had disinherited.

ALBERT II. (1397-1439), Ger. king (1438); Albert V., Duke of Austria; king of Bohemia and Hungary; fought with King Sigismund against Hussites.

ALBERT III. (1443-1500), Duke of Saxony; engaged in campaign against Charles the Bold, Duke of Burgundy (1475); famous for strength and feats of arms; founded royal House of Saxony.

ALBERT, FRANCIS CHARLES AUGUSTUS (1819-61), Prince Consort of Britain; s. of Duke of Saxe-Coburg-Gotha; m. Queen Victoria, Feb. 10, 1840. The title of Consort was conferred in 1842; that of Prince Consort in 1857. He d. of typhoid fever at Windsor, Dec. 14, 1861. Of a handsome person, possessed of great tact, the Prince Consort by the purity and usefulness of his life endeared himself to all classes.

ALBERT, FREDERICK AUGUSTUS (1828-1902), king of Saxony; succ. 1873; at age of twenty-one was engaged in campaign of Schleswig-Holstein against the Danes, and took prominent part in later wars of period.

ALBERT, FRIEDRICH RUDOLF (1817-95), Archduke of Austria; field-marshal; e.s. of Archduke Charles; bred to arms from his early years, he took a prominent part in Italian Wars (1848-70), and won reputation as a brilliant general.

ALBERT LEOPOLD CLEMENT-MARIE MEINRAD (1875), King of the Belgians, succeeded his uncle Leopold II. (1909). When Germany demanded that Belgium should violate the international treaties of 1831 and 1839 by granting free passage through Belgium to the Ger. armies, the king and his ministers declared for resistance, although aware of the sufferings in store for their country. Throughout the war the king was in the field with his army, and faced all the dangers of the campaigns. On various occasions Germany made overtures to him, and offered to restore his kingdom if he would abandon the Allies; all such proposals were rejected with scorn. His invincible loyalty, his constancy, and his courage have made him in the eyes of the world one of the brightest and purest heroes of that mighty struggle. He is a man of scientific turn of mind, and his queen, Elizabeth, a Bavarian princess, is a

qualified oculist.

ALBERT, PRINCE OF MECKLENBURG (d. 1412), was called to the throne of Sweden in 1364 by the nobility who had deposed King Magnus. After a long war, peace was re-established in Sweden in 1395, when A. consented to give up his claims to the crown. He then retired into Mecklenburg, where he died. Margaret of Waldemar, widow of Haquin, King of Norway, succeeded him, and united the three N. kingdoms under one sceptre.

ALBERT EDWARD NYANZA (0° 20' S., 29° 45' E.), lake, upper Nile, basin in Belgian Congo; greatest length, 44 miles; breadth, 32 miles; discovered by Stanley, 1889.

ALBERT LEA, a city of Minnesota, the county seat of Freeborn co., situated about 100 miles south of Minneapolis, in the midst of attractive natural surroundings which make it a popular summer resort. The railroads serving it are the Chicago, Milwaukee and St. Paul, the Minneapolis and St. Louis, the Chicago, Rock Island and Pacific, the Iowa Central, and the Illinois Central. Among its attractions are parks and boulevards and two lakes. Around the city is an extensive agricultural and dairying region, of which it is a center. It is also developing industrially, having plants manufacturing gas-engines, paper boxes, and tanks, as well as creameries and packing houses. The city's notable buildings include a handsome court house the Albert Lea College for Women, and the Luther Academy. Pop. 1920 8,056.

ALBERT NYANZA (1° 30' N., 31° E.), lake, Nile basin, British Uganda; greatest length, c. 100 miles; width, over 20 miles; receives Samliki River from Albert Edward Nyanza at S.W. end; northern outlet, White Nile; first discovered by Sir Samuel Baker, 1864; circumnavigated by Gessi Pasha, 1876, Emin Pasha, 1884.

ALBERTA, prov. since 1905, W. Canada (52° 40' N., 114° 20' W.); was one of N.W. Territories. Surface generally level in N. and S.E., mountainous in W., which is occupied by Rockies; much of S. is prairie; chief rivers; Smoky, Peace, Athabasca, Saskatchewan; lakes: Lesser Slave, Claire, part of Athabasca; climate healthy; rainfall, 13 in. In N. are forests; S.W. is important ranching district, raising great numbers of cattle, horses and sheep; dairying carried on. Wheat and other grains cultivated; fruits and tobacco. Minerals include coal, lignite, petroleum, natural gas, asphalt, iron, gold, silver, copper. At

Banff which is part of Canadian National Park, are hot springs. Chieftns., Edmonton, Calgary. Prov. crossed by C. P. R. and branch lines. Administered by lieut.-gov.; has separate legislative assembly of fifty-eight members. Area 255,285 sq. m. Pop. 1921, 585,99. See map CANADA.

ALBERTSON, CHARLES CARROLL (1865), clergyman; b. Plainfield, Ind. He was educated for the law, but subsequently studied theology. He held Presbyterian pastorates at Goshen, Ind., Jamestown, Buffalo and Rochester, N. Y., Philadelphia, Pa., from 1888 till 1913, when he became pastor of the Lafayette Avenue Presbyterian Church, Brooklyn, N. Y. He wrote numerous poems, essays and other works, including *Chapel Talks*, 1916, and *Prophets and the War*, 1918.

ALBERTUS MAGNUS (c. 1206-80), theologian, teacher of Thomas Aquinas; one of most learned men of his time, student of Aristotle, and of natural science; wrote commentaries on Peter Lombard and Aquinas, and much else; studied by Dante.

ALBI (43° 55' N., 2° 5' E.); town, France; cathedral and abp.'s palace. Pop. 25,100.

ALBIAN, the lowest stage of the Upper Cretaceous rocks, including Upper Greensand and Gault in England; continental geologists use the term for the youngest stage of the Lower Cretaceous. It is well developed in the Department of Aube. (France), corresponding formations being Flammenmergel (Germany), Fredericksburg beds (N. America), and Upper Sandstones of Nubia. See CRETACEOUS.

ALBIGENSES, name applied about 1200 to religious sect of southern France, offshoot of a movement in both Eastern and Western Christendom. Their exact beliefs are uncertain, but they certainly disbelieved in the sacramental system of Catholicism and protested against clerical abuses. Many were Catharists. St. Bernard and St. Dominic tried to convert them, and they were finally crushed as heretics with great cruelty in XIII. cent.

ALBINISM, the lack of pigmentation in plants and animals which are normally pigmented. In certain cases, however, as in certain flowering plants and in arctic animals, this character has become specific. It may be complete or partial. In man the hair and skin may be white, and the eyes are extremely sensitive to light, and appear pink owing to the iris being devoid of pig-

ment and the blood of the capillaries shining through retina, iris, and cornea. Negroes, in whom a. is particularly obvious, sometimes show irregular white patches all over the body, giving it a piebald appearance, and it is probable that partial a. occurs in Europeans but is not so noticeable on account of the pale skin. Seasonable a. in animals, such as hares and ptarmigans, which have white fur or feathers during winter, is not complete, as the pigmentation of the eye is maintained, the unpigmented state being obviously disadvantageous. Lack of pigment in other animals, e.g. worms, beetles, fishes, frogs, is often due to the absence of the stimulus of light, and is especially noticeable in cave animals. True a. is not acquired, and, therefore, not curable, but is inherited. It seems that a mendelian transmission takes place, and this is evidently corroborated by the occurrence of albinotic offspring from marriages of first cousins. A., whether in man or animals, may be regarded as a 'recessive' character. See HEREDITY.

ALBINO. See ALBINISM.

ALBION, a city of Michigan, situated on the Kalamazoo river in Calhoun co., in the southern part of the State about 60 miles southeast of Grand Rapids. The railroads serving it are the Michigan Central, the Lake Shore and Michigan Southern, and an electric line operating between Kalamazoo and Detroit. The city has a number of busy plants producing iron manufactures, automobile accessories including springs, and farm implements. Among its scholastic establishments is Albion College, a co-educational institution founded under the auspices of the Methodist Episcopal Church. It possesses a library, two hospitals and a park. Pop. 1910, 5,833; 1920, 8,354.

ALBOIN (d. 573), king of Lombards; conquered Italy, murdered at instance of his wife, Rosamund, whom he had forced to drink wine from cup made from her f.'s skull; favorite subject of poets and dramatists.

ALBOLENE, a hydrocarbon oil produced from petroleum. It is used in medicine to carry remedies to be sprayed into the nose and deeper air passages; also for wounds.

ALBRIGHT, JACOB (1759-1808). Amer. preacher, of German descent; founder of dissenting sect known as 'New Methodists.'

ALBUERA, Spanish vil. in prov. of Badajoz, 13 in. S.E. of tn. of Badajoz.

ALBUMIN

Famous for the defeat of the Fr. under Marshall Sout by the British and Portuguese, 1811. Pop. 800.

ALBUMIN, term for very complex organic compounds containing carbon, hydrogen, nitrogen, oxygen, and sulphur varying within certain limits of percentage. They are soluble in water as serum and egg albumen. Albumins are formed in plants, especially in seeds, from simple compounds, and form an essential part of the animal organism. The white of egg (albumen) is a well-known Albumin. One variety enters largely into the composition of animal fluids and solids, and is coagulated by heat at and above 160°. It is composed of carbon, hydrogen, nitrogen and oxygen, together with a little sulphur. This form is found in the serum of the blood, in the humors of the eye, and in the juice of flesh, etc. The human blood contains about 7 per cent of albumen. Another variety, which is called vegetable albumen, is found in most vegetable juices and many seeds, and has nearly the same composition properties as egg albumen. The name is given in botany to farinaceous matter, which surrounds the embryo. Acid albumen is formed by adding a small quantity of diluted hydro-chloric acid to serum or egg albumen and gradually raising the temperature to 70°. The a. solution is characterized by rotating the plane of polarized light, and they are colloids, i.e. do not diffuse through animal or vegetable membranes. Many coagulate on being boiled with water or treated with certain acids. The following outline of classification is convenient. 1. *A. proper*: egg-a., milk-a., serum-a., globulins, plant, globulins, myosin, fibrinogen, nucleo-a., caseins, vitellins, histones, protamins. 2. *Transformation products*: acid a., alkali albuminates halogen a., albumoses, peptone. 3. *Proteids*: nucleoproteids, hemoglobin, glyco-proteid. 4. *Albuminoids*: collagen, keratin, elastin, fibroin, spongin, amyloid, albumoid and coloring matters derived from a. (e.g. melanins). The synthesis of a's is one of the most interesting problems of physiological chem., and has attracted many workers, Cohnheim, Kossel, E. Fischer being a few of the more prominent investigators.

ALBUQUERQUE, a town of Mexico, in Bernalillo co., of which it is the county seat. It is on the Topeka and Santa Fe, the Santa Fe, Pacific, and other railroads. The industries include railroad shops, and foundry and machine works. The town is the seat of the University of Mexico and the government schools for Indians. Pop. 1920, 15,157.

ALCAZAR DE SAN JUAN

ALBUQUERQUE, ALPHONSO D', THE GREAT (1453-1515), Portug. explorer; sent in charge of expeditions to India, Persian Gulf, and Malabar captured Goa (1510), and Malacca; established Portug. power in India; revered by natives, but recalled through jealous rivals, and d. of broken heart.

ALBURY (36° 4' S., 146° 57' E.), tn. New South Wales; agricultural and sheep breeding center. Pop. 1920, 7,000.

ALCAICS verse in measure named from Alcaeus, Gk. lyric poet of Mitylene (fl. c. 600 B.C.).

ALCÆUS (600 B.C.) of Lesbos; one of the greatest Gr. lyric poets; composed songs of war against tyrants, hymns, and lyrics of love and wine; only fragments of his works remain. The Alcaic strophe, to which he gave his name, was the favorite metre of Horace.

ALCALA, thirteen towns in Spain:—Most famous is Alcala de Henares (40° 29' N., 3° 18' W.), near Madrid; birth-place of Cervantes; had famous Univ. removed to Madrid, 1836. Pop. 9000.—Alcala de los Gazules, Cadiz (36° 28' N., 5° 40' W.). Pop. 8877.—Alcala de Guadatra, Sevilla (37° 21' N., 5° 51' W.). Pop. 8198.—Alcala del Jucar, Albacete (39° 9' N., 1° 25' W.). Pop. 2968.—Alcala de Chisbert (40° 17' N., 0° 16' E.). Pop. 6293.—Alcala la Real (37° 28' N., 3° 55' W.). Alfonso XI. captured fortress from Moors; hence name, the 'Royal Castle.' Pop. 15,973.—Alcala del Rio (37° 30' N., 5° 57' W.), or Guadalquivir. Pop. 3006. Alcala de la Selva, in Teruel. Pop. 1490.—Alcala de la Vega, in Cuenca. Pop. 712.—Alcala de Gurrea, in Huesca. Pop. 632.—Alcala del Obispo, in Huesca. Pop. 432.—Alcala del Ebro, in Saragossa. Pop. 388.—Alcala de Moncayo, in Saragossa. Pop. 367.

ALCAMO (37° 59' N., 12° 56' E.), town Sicily. Pop. 52,000.

ALCANTARA (39° 43' N.; 6° 52' W.), town, Spain; has Rom. bridge.—**ORDER OF A.** (religious and military), established 1156, for defence against Moors; several times suppressed and revived. (2) (2° 20' S., 44° 20' W.), seaport, Brazil. Pop. 10,000.

ALCARAZ (38° 40' N., 2° 35' W.); range of mountains, Spain; loftiest peak, Sierre de A. (5,900 ft.).

ALCAZAR, name of Moorish palaces in Spain.

ALCAZAR DE SAN JUAN (39° 28' N., 3° 11' W.), town, Spain; soap manufactures. Pop. 11,500.

ALCEDO. See **KINGFISHER.**

ALCESTIS, **ALCESTE** (classical myth.), wife of Admetus, who gave herself up to death to save husband; brought back from lower world by Hercules; subject of tragedy by Euripides (q.v.).

ALCHEMY was the forerunner of chemistry, much in the same way as astrology preceded astronomy. The alchemists undertook the quest for the 'philosopher's stone' with which they hoped to convert the baser metals into gold and silver, the 'alkahest' or universal solvent, and the 'elixir vitae' by which life might be prolonged. The 'magisterium' was sought for after the action of various drugs had been investigated, and was supposed to cure all diseases. A. flourished in the Middle Ages, and, based on the work of Hermes Trismegistus and Geber, was eagerly pursued by Albertus Magnus, Lully, Roger Bacon, Paracelsus, and many others; and modern chem. is indebted to them for many discoveries and ideas. Perhaps the recent researches in radioactivity and the growing conviction of the unity of matter will, in a sense, make some of the dreams of the alchemists come true.

ALCIBIADES (c. 450-404 B.C.), Athenian statesman and general; most brilliant figure of age of Pericles, whose nephew he was; of high birth, great wealth, every personal and mental distinction. A. led anti-Lacedæmonian party; commanded expedition against Sicily; recalled and impeached for alleged mutilation of Statues of Hermes; fled to Sparta and proved dangerous enemy to Athens; Spartans became jealous; fled to Persian satrap Tissaphernes; later won great victories over both Persians and Spartans; captured Cyzicus, Chalcedon, and Byzantium for Athens; invited to return, 407, but speedily superseded; murdered in Phrygia.

ALCIDES (classical myth.), descendant of Alcæus; designation of Hercules.

ALCINOUS (classical myth.), king of Phæacians; f. of Nausicaa; host of shipwrecked Odysseus.

ALCMÆON (Gk. myth.).—Went mad after murdering his mother, Eriphyle (q.v.); killed in attempting to secure fatal necklace of Harmonia for his second wife, Callirrhoe. (2) Son of Syllus, grandson of Nestor; who left Messenia when the Heraclidæ conquered Peloponnesus, and founded at Athens the Alcmæonidæ, a family who were prominent at time of Peloponnesian War, of which Pericles and Alcibiades were members.

ALCMAN, **ALCMÆON** (d. VII. cent. B.C.) Gk. poet; Lydian slave; enfranchised and lived at Sparta; fragments of lyrics alone remain; first poet, it is said, to sing of love; inventor of choral ode; hence term **Alcmanian**, applied in Greece to lyric verse.

ALCOCK, **SIR JOHN WILLIAM** (1892-1919), Brit. airman, served with distinction in the World War, being awarded the D.S.C.; was, along with Sir Whitten Brown, the first airman to make a direct transatlantic flight from St. John's, Newfoundland, to Ireland (June 1919). Knighted for this feat (1919). See **ATLANTIC FLIGHT**. Killed while flying to Paris.

ALCOHOLISM, a term commonly applied to nervous affections resulting from the habitual use of alcohol in excess. The most common of these are delirium tremens, and alcoholic neuritis, epilepsy, or insanity. It is also applied to any of the poisonous effects of alcohol, as in acute alcoholism, which may be the result of a single excessive dose.

ALCOHOLS, a group of organic compounds consisting of a hydrocarbon radical or group combined with one or more hydroxyl groups. According to the number of hydroxyl (a group consisting of an atom of oxygen and one of hydrogen = HO) groups present, monoatomic, diatomic, triatomic, etc., a. may be distinguished, (e.g.) ordinary a. (ethyl a. $\text{CH}_3\text{CH}_2\text{OH}$), glycol (ethylene alcohol $\text{CH}_2\text{OH}\cdot\text{CH}_2\text{OH}$), glycerin (glycerol $\text{CH}_2\text{OH}\cdot\text{CHOH}\cdot\text{CH}_2\text{OH}$). Primary a's contain the group CH_2OH , and are oxidized to form a corresponding aldehyde or acid with the same number of carbon atoms. Secondary a's contain the group CHOH combined with two hydrocarbon radicals, and form ketones on oxidation and acids with a lesser number of carbon atoms on further oxidation. Tertiary a's are characterized by the group $\text{C}\cdot\text{OH}$ combined with three hydrocarbon radicals, and yield simpler compounds on oxidation.

'Spirits of wine' or ethyl alcohol is a colorless, mobile, inflammable liquid, B.P. 78°, M.P. 112°, S.G. .79, and is formed by the fermentation of saccharine liquids, the raw materials being grapes, barley and other cereals, potatoes, molasses, sugar, honey, apples, cherries, etc. It is used in beverages, in med., and for industrial purposes as a solvent or as fuel. In the latter case it is 'denaturized,' to avoid the high excise duty, by different agents according to the purpose for which it is required, methyl a. and pyridine being most commonly applied. Absolute a. contains only 1% of water.

The physiological effects of *a.* on animal organisms are mainly depressant after a period of stimulation, and toxic effects appear when *a.* is taken in large quantities, causing diseases of stomach, liver, kidneys, heart, blood-vessels, and nervous system. As regards the hereditary consequences of chronic alcoholism it may be said that alcoholism is in most cases not so much the cause as the effect of a disordered nervous system.—Alcoholometry, estimation of amount of *a.* in liquid either by HYDROMETER when *a.* diluted by water only, or in other cases by distilling it off.

ALCOTT, AMOS BRONSON (1799-1888), Amer. educationalist; was associated much with Emerson, and lectured on Transcendentalism; author of *Tablets* (1868), *Concord Days* (1872), and other books.

ALCOTT, LOUISA MAY (1832-88), Amer. authoress; popular writer for girls, her best-known books being *Little Women* and *Little Men*.

ALCOY (38° 42' N., 0° 26' W.), town, Spain; manufactures linen, paper. Pop. 32,000.

ALCOIN (b. 735), Eng. ecclesiastic and scholar; b. York; spent much time at court of Charlemagne, in whose realm he spread civilization and learning; presided over famous school and abbey of St. Martin at Tours. *A.* wrote numerous graceful letters, several poems, and some theological treatises.

ALDA, FRANCES (1883), operatic soprano; b. Christchurch, New Zealand. She studied singing under Mme. Marchesi in Paris, where she made her debut at the Opera Comique in 1904. Later she sang in grand opera in Brussels, Parma and Milan. In 1908 she appeared at the Metropolitan Opera House, New York, under the management of Signor Gullo Gatti-Casazza (whom she married), and sang for several seasons there, as well as at many concerts throughout the United States.

ALDEBARAN, a Tauri, red first-magnitude star having a brilliancy 27 times that of the sun, brightest star in the Hyades.

ALDEHYDES, organic compounds of the general formula $R.CHO$, in which *R* is an aryl or alkyl are derived from alcohols by oxidation, and yield acids when oxidized themselves, (e.g.), methyl alcohol (CH_3OH) yields formaldehyde ($H.CHO$) which may be oxidized to formic acid ($H.COOH$).

ALDEN, CYNTHIA MAY WEST-OVER (1862), journalist; b. Afton,

Iowa; m. (1906) John Alden of the Brooklyn Eagle. At the beginning of her career, after graduating at the Denver Business College and obtaining the B. A. degree of the University of Colorado, she engaged in teaching geology, book-keeping and vocal music. In New York City she became known as a soprano soloist in a number of church choirs, where she sang for several years. She was chiefly known in her journalistic work for interest in child welfare, founding the International Sunshine Society, an extensive philanthropic newspaper club with a membership of more than 300,000, and the International Sunshine Blind Babies' nurseries, homes, hospitals and kindergartens, the only institutions of the kind in the United States. In many states laws have been enacted for the care of the baby blind, largely through her efforts. As an author she wrote *Child Life in the Far West*; *Women's Ways of Earning Money*; and *The Baby Blind* (1915) among other works.

ALDEN, HENRY MILLS (1836-1919), an American editor and writer b. at Mt. Tabor, Vt., Graduating from Williams College, in 1857, he studied at the Andover Theological Seminary, but never entered the ministry. In 1861 he went to New York where he at once formed his life-long connection with Harper Bros., becoming editor of *Harpers' Weekly* in 1863. Six years later he relinquished this position to assume editorship of *Harpers' Magazine*, a publication which in those days had a national influence. Mr. Alden was known as a literary man of scholarly attainments, whose high standards had a powerful influence in developing an American literature of the best quality. His own individual contributions were voluminous, but of the quality equal to the best that he chose in others. Among his works are *'The Ancient Lady of Sorrow'* (poems, 1872), *'God in His World'* (1890); and *'A Study of Death'* (1895). *'Magazine Writing and the New Literature'* (1908). To these may be added many magazine articles of the less permanent nature.

ALDEN, JOHN (b. 1687), Amer. settler; sailed in *Mayflower* (1620); romance of his life told in Longfellow's *The Courtship of Miles Standish*.

ALDEN, RAYMOND MACDONALD (1873), university professor and author; b. New Hartford, N. Y. He was an instructor and assistant professor in English at George Washington University of Pennsylvania, Harvard and Leland Stanford. Later he became

professor of English at the University of Illinois and then at Leland Stanford, his tenure of the last named post dating from 1914. As an author he wrote on English satire and poetry, edited selected works of *Shakespeare*, *Scott*, *Francis Beaumont* and *Thoreau*, and contributed short fiction to various periodicals, among the last named a story that won the third prize of \$1,000 in *Collier's* short-story contest, 1905.

ALDER (*Alnus*), genus of shrubs or trees of the order Betulaceae, growing in moist places, often in thickets, in the N. temperature zone and W. South America. The wood is used by turners, and, owing to its durability under water, for piles in building (e.g. in Venice and Amsterdam), and the bark in tanning and dyeing.

ALDER-FLY (*Sialidoc*), neuropterous (i.e. with net-veined wings) insects related to the ant-lions, with aquatic larvae.

ALDERMAN (A.S. *Baldorman*), literally, 'older man'; hence counsellor and magistrate; in modern England, municipal officer advanced from ranks of city or town-councillors; the Scot. equivalent is 'Baillie.'

ALDERMAN, EDWIN ANDERSON, 1861, university president; b. Wilmington, N. C. An educational authority of the South, he became president of the University of Virginia in 1904, after being professor of history, professor of education and president of the University of North Carolina, and president of Tulane University from which he earlier received the degree of Ph. B. and LL. D. respectively, as well as D.C.L. from the University of the South. He was also identified with Johns Hopkins, Columbia, Yale, Williams, Harvard and Dartmouth seats of learning. His writings, which embraced a variety of subjects, included *Southern Idealism*; *The Spirit of the South*; *Sectionalism and Nationality*; and *Some Tests of an Educated Man*. He was editor-in-chief of the Library of Southern Literature.

ALDERNEY (49° 43' N., 2° 10' W.), most northerly of Channel Islands (q.v.); area, 1962 acres; coast outlined by rocks and reefs; 'Caskets' especially dangerous in bad weather; Race of A. separates island from Normandy; surface is level tableland; vegetables, grain; once famous breed of cattle; capital, the picturesque town St. Anne; harbor at Braye. Pop. c. 2500.

ALDESKOT (51° 14' N., 0° 46' W.), urban district, Hampshire. Camp established, 1855; permanent buildings

erected, 1881; reconstruction began, 1890. Marlborough Lines have field artillery and five infantry barracks; Stanhope Lines, Royal Engineers, Army Service Corps, and five infantry barracks. Pop. 1921, 35,000.

ALDIN, CECIL CHARLES WINDSOR, (1870), artist; b. Slough, Eng. After studying anatomy at South Kensington, London, and animal painting under Frank W. Calderon. He became notable as a magazine and book illustrator and published a number of pictorial books embracing a variety of hunting scenes and views of old inns.

ALDOBRANDINI, SILVESTRO (1499-1558), Ital. jurist belonging to famous Florentine family. His s. Ippolito reigned as Pope Clement VIII. (1592-1605). Clement's nephew Pietro (1572-1621) became cardinal and owned the villa whither was taken the antique fresco, discovered in Rome, 1806, and called the *Aldobrandinish Wedding*.

ALDRICH, JOHN MERTON, (1866), entomologist; b. Olmstead co., Minn. After studying entomology and other scientific fields at the University of Minnesota, Michigan Agricultural College and the University of Kansas, he became a professor of zoology and biology; then (1918) custodian of diptera and (1919) associate curator of insects of the U. S. National Museum. In the course of his scientific work he compiled a catalogue of North American Diptera and wrote *Sarcophaga and Allies*, 1916. He visited Alaska in 1921, investigating and collecting insect specimens of that region.

ALDRICH, MILDRED (1853), author; b. Providence, R. I. A resident of France. Her recent works relate to the World War in that country and include *Hilltop on the Marne* (1915); *Told in a French Garden* (1918); *On the Edge of the War Zone* (1917); *Peak of the Load* (1918); and *When Johnny Comes Marching Home* (1919).

ALDRICH, NELSON WILMARTH (1841-1915), an American legislator; b. in Foster, R. I. As the son of a poor farmer, he had very little early education and from the age of 12 to 16 served as a clerk in a country store. By his own efforts he then managed to enter Greenwich Academy, from which he graduated in 1857. He then entered a large wholesale house, in Providence, later becoming interested in local politics. In 1869 he was elected to the Common Council of the city, where he quickly attracted attention as an authority on business and especially on finances. In 1875 he was elected to the State Legis-

lature, where he was speaker of the House during 1876. In that same year he was elected to Congress, to fill a vacancy. In 1881 he was re-elected, but soon after resigned to represent his state in the U. S. Senate. Here he served for nearly twenty-five years, finally refusing to accept renomination after his last term had ended, in 1911. For over twenty years he was Republican leader in the Senate. His name stands forth prominently as a great authority on national banking and finance and is especially associated with the passing of the Payne-Aldrich tariff bill, in 1910. He was an ardent protectionist, the leader of conservative elements.

ALDRICH, RICHARD, (1863), music critic; b. Providence, R. I. He studied music at Harvard and in Germany and began his career as a music and dramatic critic and editorial writer on the Providence Journal, later joining the staff of the New York Tribune and becoming (1902) music critic of the New York Times. He translated Lilli Lehmann's *How to Sing* and wrote *A Guide to Parsifal* and *A Guide to the Nibelungen Ring*. In the later stages of the World War he was a captain, U. S. A. attached to the Military Intelligence Division of the General Staff.

ALDRICH, THOMAS BAILEY (1836-1907), Amer. novelist and poet; editor *Atlantic Monthly* (1881-90); author of *Prudence Palfrey* (1874), *Queen of Sheba* (1877), *The Stillwater Tragedy* (1880), *The Story of a Bad Boy*; *Marjorie Daw* and others; also several volumes of verse.

ALDRICH, WILLIAM SLEEPER, (1863), technical educator; b. Philadelphia, Pa. He was educated for the navy, graduating from Annapolis in 1883. Later he studied engineering at the Stevens Institute of Technology, taking an engineering degree, and became a member of the staff of Johns Hopkins University. From 1893 to 1911 he occupied posts as professor of Mechanical Engineering and director of mechanical arts at West Virginia University, professor of mechanical engineering and head of the Department of Electrical Engineering at the University of Illinois, and director of the Thomas S. Clarkson School of Technology. Building construction, architecture and electrical engineering were among the subjects of his published writings. He was a member of a number of scientific bodies.

ALE, term variously applied to beer (Scot. 'yill'). See *Brewing*. *Heather Ale*, a legendary drink in the Scot. Highlands, Galloway and parts of Ireland.

ALEMAN, MATEO (c. 1550-1809), Span. novelist; author of picturesque novel. *Guernan de Alfarache* (1559).

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ALEPPO (Turkish *Haleb* or *Shabba*; anc. *Beroea*) (36° 12' N., 37° 9' E.),

professor of English at the University of Illinois and then at Leland Stanford, his tenure of the last named post dating from 1914. As an author he wrote on English satire and poetry, edited selected works of *Shakespeare*, *Scott*, *Francis Beaumont* and *Thoreau*, and contributed short fiction to various periodicals, among the last named a story that won the third prize of \$1,000 in *Collier's* short-story contest, 1905.

ALDER (*Alnus*), genus of shrubs or trees of the order Betulaceæ, growing in moist places, often in thickets, in the N. temperature zone and W. South America. The wood is used by turners, and, owing to its durability under water, for piles in building (e.g. in Venice and Amsterdam), and the bark in tanning and dyeing.

ALDER-FLY (*Sialidoc*), neuropterous (i.e. with net-veined wings) insects related to the ant-lions, with aquatic larvae.

ALDERMAN (A.S. *Ealdorman*), literally, 'older man'; hence counsellor and magistrate; in modern England, municipal officer advanced from ranks of city or town-councillors; the Scot. equivalent is 'Baillie.'

ALDERMAN, EDWIN ANDERSON, 1861, university president; b. Wilmington, N. C. An educational authority of the South, he became president of the University of Virginia in 1904, after being professor of history, professor of education and president of the University of North Carolina, and president of Tulane University from which he earlier received the degree of Ph. B. and LL. D. respectively, as well as D.C.L. from the University of the South. He was also identified with Johns Hopkins, Columbia, Yale, Williams, Harvard and Dartmouth seats of learning. His writings, which embraced a variety of subjects, included *Southern Idealism*; *The Spirit of the South*; *Sectionalism and Nationality*; and *Some Tests of an Educated Man*. He was editor-in-chief of the Library of Southern Literature.

ALDERNEY (49° 43' N., 2° 10' W.), most northerly of Channel Islands (q.v.); area, 1962 acres; coast outlined by rocks and reefs; 'Caskets' especially dangerous in bad weather; Race of A. separates island from Normandy; surface is level tableland; vegetables, grain; once famous breed of cattle; capital, the picturesque town St. Anne; harbor at Braye. Pop. c. 2500.

ALDESHOT (51° 14' N., 0° 46' W.), urban district, Hampshire. Camp established, 1855; permanent buildings

erected, 1881; reconstruction began, 1890. Marlborough Lines have field artillery and five infantry barracks; Stanhope Lines, Royal Engineers, Army Service Corps, and five infantry barracks. Pop. 1921, 35,000.

ALDIN, CECIL CHARLES WINDSOR, (1870), artist; b. Slough, Eng. After studying anatomy at South Kensington, London, and animal painting under Frank W. Calderon. He became notable as a magazine and book illustrator and published a number of pictorial books embracing a variety of hunting scenes and views of old inns.

ALDOBRANDINI, SILVESTRO (1499-1558), Ital. jurist belonging to famous Florentine family. His s. Ippolito reigned as Pope Clement VIII. (1592-1605). Clement's nephew Pietro (1572-1621) became cardinal and owned the villa whither was taken the antique fresco, discovered in Rome, 1606, and called the *Aldobrandinisch Wedding*.

ALDRICH, JOHN MERTON, (1866), entomologist; b. Olmstead co., Minn. After studying entomology and other scientific fields at the University of Minnesota, Michigan Agricultural College and the University of Kansas, he became a professor of zoology and biology; then (1918) custodian of diptera and (1919) associate curator of insects of the U. S. National Museum. In the course of his scientific work he compiled a catalogue of North American Diptera and wrote *Sarcophaga and Allies*, 1916. He visited Alaska in 1921, investigating and collecting insect specimens of that region.

ALDRICH, MILDRED (1853), author; b. Providence, R. I. A resident of France. Her recent works relate to the World War in that country and include *Hilltop on the Marne* (1915); *Told in a French Garden* (1916); *On the Edge of the War Zone* (1917); *Peak of the Load* (1918); and *When Johnny Comes Marching Home* (1919).

ALDRICH, NELSON WILMARTH (1841-1915), an American legislator; b. in Foster, R. I. As the son of a poor farmer, he had very little early education and from the age of 12 to 16 served as a clerk in a country store. By his own efforts he then managed to enter Greenwich Academy, from which he graduated in 1857. He then entered a large wholesale house, in Providence, later becoming interested in local politics. In 1869 he was elected to the Common Council of the city, where he quickly attracted attention as an authority on business and especially on finances. In 1875 he was elected to the State Legis-

ALDRICH, RICHARD

lature, where he was speaker of the House during 1876. In that same year he was elected to Congress, to fill a vacancy. In 1881 he was re-elected, but soon after resigned to represent his state in the U. S. Senate. Here he served for nearly twenty-five years, finally refusing to accept renomination after his last term had ended, in 1911. For over twenty years he was Republican leader in the Senate. His name stands forth prominently as a great authority on national banking and finance and is especially associated with the passing of the Payne-Aldrich tariff bill, in 1910. He was an ardent protectionist, the leader of conservative elements.

ALDRICH, RICHARD, (1863); music critic; b. Providence, R. I. He studied music at Harvard and in Germany and began his career as a music and dramatic critic and editorial writer on the Providence Journal, later joining the staff of the New York Tribune and becoming (1902) music critic of the New York Times. He translated Lilli Lehmann's *How to Sing* and wrote *A Guide to Parsifal* and *A Guide to the Nibelungen Ring*. In the later stages of the World War he was a captain, U. S. A. attached to the Military Intelligence Division of the General Staff.

ALDRICH, THOMAS BAILEY (1836-1907), Amer. novelist and poet; editor *Atlantic Monthly* (1881-90); author of *Prudence Palfrey* (1874), *Queen of Sheba* (1877), *The Stillwater Tragedy* (1880), *The Story of a Bad Boy*; *Marjorie Daw* and others; also several volumes of verse.

ALDRICH, WILLIAM SLEEPER, (1863), technical educator; b. Philadelphia, Pa. He was educated for the navy, graduating from Annapolis in 1883. Later he studied engineering at the Stevens Institute of Technology, taking an engineering degree, and became a member of the staff of Johns Hopkins University. From 1893 to 1911 he occupied posts as professor of Mechanical Engineering and director of mechanical arts at West Virginia University, professor of mechanical engineering and head of the Department of Electrical Engineering at the University of Illinois, and director of the Thomas S. Clarkson School of Technology. Building construction, architecture and electrical engineering were among the subjects of his published writings. He was a member of a number of scientific bodies.

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ALESHIRE, JAMES

city, cap. of vilayet of same name, Asia Minor, 70 m. S.E. of its port, Alexandretta; in fertile plain; important trade center before discovery of sea route to India. Conquered by Saracens (A.D. 636); sacked by Tamerlane (1402); captured by Turks (1517); its citadel said to resemble Edinburgh Castle; burial-place of Saladin; manufactures silk and cotton stuffs. During Brit. campaign in Palestine and Syria, Aleppo was practically the last place captured before the Armistice (Oct. 25, 1918). The city was placed under Arab administration in December 1919.

ALESHIRE, JAMES BUCHANAN (1856), major general, U. S. A.; b. Gallipolis, Ohio. After graduating at the U. S. Military Academy in 1880, he passed through various army ranks, becoming quartermaster-general with the rank of brigadier-general in 1907, major-general in 1912, and again quartermaster-general in 1914. Early in his career he served in operations against the Indians, and in Cuba, China, and the Philippines. He retired in 1916.

ALESSANDRIA.—(1) (44° 54' N., 8° 39' E.), Cathedral town, fortress, and railway center, Italy; called after Pope Alexander III.; near field of *Marengo*. Pop. 75,700. (2) Province, N. Italy. Pop. 807,500.

ALEUTIAN ISLANDS (52° N., 175° E.), long series of islands, Pacific; extend over 1000 miles towards Kamchatka from Alaska Peninsula; many are volcanic; largest Unimak, has two volcanoes; principal industries, fishing, hunting, sealing; Unalaska is sealing and whaling center; discovered by Russ. explorers, Chirikov and Bering, 1741. Inhabitants (Aleuts) are of Eskimo origin; peace-abiding; converted to Gk. Church. Pop. c. 2000. See *MAP ALASKA*.

ALEWIFE (or Gaspereau), a fish of herring family, frequenting N. Amer. coast rivers.

ALEXANDER (1461-1506); King of Poland; s. of Casimir IV.; owing to his poverty was unable to resist incursions of Tartars who overran Poland during his reign.

ALEXANDER, name of eight Popes.

ALEXANDER II, POPE (1061-73); deposed by Council of Mantua. Alexander III., Pope (1159-81); antagonist of Frederick Barbarossa; president at Lateran Council, 1179, which decreed a two-thirds majority of cardinals requisite for papal elections; very powerful in the Europe of his day. Alexander IV., Pope (1254-61); tried to reconcile Eastern and Western Churches. Alexander

ALEXANDER II

V., Pope (1409-10); elected by Council of Pisa, a scholar and theologian. Alexander VI. (Rodrigo Borgia), Pope (1431-1503); nephew of Calixtus III. He was early promoted in the Church, and showed signs of worldliness and immorality. He won his election by bribery, and during his pontificate his one great aim was to provide handsomely for his natural children; the best known of these were Giovanni, Duke of Gandia, Cesare and Lucrezia Borgia. The Duke of Gandia was murdered, probably by his bro. Cesare, who was made gov. of the Papal States. A. lived an utterly worldly life and has a worse reputation than any other Pope, and was very bad, even judged by the standard of a corrupt age. Alexander VIII., Pope (1689-91); refused to recognize liberties of the Gallican Church.

ALEXANDER I (1078-1124), King of Scotland; s. of Malcolm Canmore and St. Margaret; founded abbeys of Scone and Inchcolm.

ALEXANDER II (1198-1249), King of Scotland; succ. f., William the Lion; commenced warlike operations against Norsemen, to whom the Western Isles were subject; a good and wise king.

ALEXANDER III (1241-85), King of Scotland; s. of above; renewed hostilities against King Haakon, whom he defeated in a sea-fight at Largs. Finally the Western Isles and Isle of Man were ceded to Scotland, Orkney and Shetland still being held by Norsemen; gave Scotland unprecedented peace and prosperity.

ALEXANDER I (1777-1825), Czar of Russia; s. of Paul I. who was murdered (1801). He commenced his reign with the warmest desire to promote his people's welfare, and to improve the administration of Russia. Napoleon made strenuous efforts to secure A.'s friendship and adherence, and dazzled him with extravagant promises. But their amiable relations gradually changed to a settled hatred which culminated in Napoleon undertaking the disastrous invasion of Russia, the final downfall of the Fr. Emperor leaving A. the most powerful European sovereign. The brilliant promise of the Czar's youth with regard to his country's internal progress was not realized, for he left an administration of veiled tyranny; a disaffected army; a worthless educational system; and an exhausted treasury. At the same time it should be stated that A. had many attractive personal qualities which served to render him very popular.

ALEXANDER II (1818-81); Czar of

ALEXANDER III.

Russia; s. of Nicholas I.; nephew of Alexander I.; m. Princess Marie of Hesse (1841); succ. 1855, during progress of Crimean War; emancipated 23,000,000 serfs, 1861; extended Russian Empire in Central Asia and the Caucasus; waged war on Turkey on behalf of Slavs, 1877-78; much of latter part of his reign was taken up with efforts to suppress the revolutionary party; assassinated by bombs (March 13).

ALEXANDER III. (1845-94), Tsar of Russia; s. of Alexander II.; m. Princess Dagmar of Denmark, 1866; spent most life in seclusion of palace; favored reactionary party in internal affairs; cultivated friendship of France.

ALEXANDER I. (342 B.C.), King of Epirus; bro. of Olympias, Alexander the Great's mother; m. Cleopatra, Philip of Macedon's dau.

ALEXANDER (III). THE GREAT (356-323 B.C.), King of Macedon; s. of Philip II. of Macedon, and Olympias, sister of Alexander I. of Epirus. Educated under the direction of Aristotle, he was left in charge of the kingdom at the age of sixteen when his f. advanced against Byzantium. During this period he displayed remarkable courage when leading the charge which broke the Sacred Band of Thebans at *Choeronea* (338). Two years later Philip was assassinated, and A. succeeded to the throne. His first business was to put down risings of the Illyrians and Triballians, but scarcely had order been restored when news came that the Thebans had taken up arms, and that the Athenians were about to join them. A. then, by a rapid march, took the Thebans by surprise, conquered and razed their city, sparing only the house which had been occupied by the poet Pindar. Many thousands of the inhabitants were slain, and 30,000 sold into slavery. This severity reduced Greece to obedience.

The king next prepared for a war against Persia; crossed the Hellespont (334) with 35,000 men, and won a brilliant victory over the Persians at the river *Granicus*. As a consequence many of the cities of Asia Minor opened their gates to the victor, though some of the fortresses made a brave show of resistance, and it was during this campaign that A. severed the 'Gordian knot' (q.v.), which, it was fabled, could only be done by the conqueror of Asia. He next marched against the army of Darius, whom he completely overthrew at *Issus* (333), when the immense treasures of the Persian, as well as the family of Darius, fell into his hands, though the leader himself escaped; A. next subdued the principal cities of

ALEXANDER I.

Syria; marched victoriously through Palestine; overran Egypt, and founded the city of Alexandria (331). Marching through the Libyan desert to consult the oracle of Ammon, he was hailed by the priest as the offspring of Zeus. Inspired with this thought of invincibility he again marched against Darius, whom he routed at *Arbela*, though far outnumbered by the Persians. Darius escaped, but Babylon and Susa surrendered their vast treasures to the conqueror, who soon afterwards marched triumphantly into Persepolis, the Persian capital. A.'s next great undertaking was the invasion of India (326), when, having conquered the Punjab, he was compelled to return to Persia through a spirit of unrest which had taken hold of his troops. During one of the battles in India the king's famous charger, Bucephalus (q.v.), was killed. Upon his return to Babylon A. was suddenly smitten with fever, dying in eleven days, in his thirty-second year. He was buried in a golden coffin at Alexandria, and received divine honors, Great as were most of the actions of A., he appears to have become intoxicated with success, and fell into habits of debauchery. In one of his drunken fits he set fire to and destroyed Persepolis at the bidding of one of his courtesans.

ALEXANDER I., OBRENOVITCH (1876-1903), King of Serbia; succeeded his father Milan (abdicated 1889); became unpopular by reason of his reactionary legislation and his marriage with Draga Maschin; as result of a military conspiracy both were assassinated.

ALEXANDER I (1893-1920), King of Greece, second son of Constantine I. and Queen Sophie. He was given a liberal education, and for a while studied at Oxford University, in England. Later he entered the Greek Army, serving as a captain of artillery. The young prince played no prominent part in the arena of politics during the early period of the World War, as his elder brother, Prince George, Duke of Sparta, stood between him and the throne of Greece, as Crown Prince. At a later period, however, when King Constantine became more and more obnoxious to the Allies, on account of his pronounced pro-German tendencies, the Crown Prince showed himself closely in sympathy with his father's point of view. When, therefore, Constantine was finally compelled to abdicate, in June, 1917, the Allies refused to consider Prince George as his successor. The next choice fell on Alexander, and on June 13, 1917, he was formally installed

ALEXANDER

as King of Greece. Some difficulty was raised by certain conservative Greek elements on account of his marriage to a plebeian, Mlle. Helen Manos, but this obstacle was in process of being compromised when, in October, 1920, the young King was bitten by a pet monkey from which he died a few days later.

ALEXANDER, King of Jugo-Slavia (1888), second son of King Peter of Serbia, greatly distinguished himself as commander of the 1st Army in Balkan Wars. He was commander-in-chief of the Serbian armies during the Great War, and accompanied the retreat through Albania (1915). The reconstituted Serbian army which served in Salonica was also commanded by him. As a result of the union of the Serbs, Croats, and Slovenes, he became King of Jugo-Slavia. He is of good ability, constitutionally inclined, and very popular. In 1921 he married Prince Marie, daughter of Constantine of Greece.

ALEXANDER I. (of Battenberg), elected in 1879 Prince of Bulgaria; annexed Eastern Rumelia and won success in resulting war with Serbia; forced to abdicate by Russian intrigue, he was restored to the throne by a counter-revolution, but shortly afterwards abdicated (1886).

ALEXANDER, ARCHIBALD (1772-1851), Amer. Presbyterian preacher and author; first Prof. of Theol. at Princeton; wrote *Brief Outline of the Evidences of the Christian Religion* (1825), which has passed through many editions.

ALEXANDER ARCHPELAGO (55° N., 133° W.), islands (over 1100) stretching along coast, Brit. Columbia.

ALEXANDER SEVERUS (222-35 A. D.), Rom. Emperor; Syrian prince by birth; proclaimed Emperor at fourteen by the Praetorians, after murder of Heligobalus; dominated by his mother, Julia Mamaea, and others; slain in Gaul by mutinous troops; possessed many excellent qualities as emperor.

ALEXANDER, DE ALVA STANWOOD (1845), ex-Congressman; b. Richmond, Maine. After graduating from Bowdoin College (1870) he edited the Fort Wayne (Ind.) Daily Gazette, practised law at Indianapolis, and became an auditor of the U.S. Treasury. In 1885 he returned to the law and established a practice at Buffalo, N. Y., with which he was identified throughout his career. Between 1889 and 1893 he was U.S. attorney for the Northern District of New York. Elected to Congress as a Republican in 1897 for

ALEXANDRIA

the 33rd New York District, he represented that section until 1903, when he became the representative of the 30th District, his Congressional service ending in 1911. He was the author of *Political History of the State of New York and History and Procedure of the House of Representatives*.

ALEXANDER, GEORGE (1843), Presbyterian clergyman; b. West Charlton, N. Y. He was ordained in 1870 after graduating at the Princeton Theological Seminary and was appointed to pastorates in Schenectady and New York, occupying that of the First Presbyterian Church in the latter city since 1919. He became president of the Council of New York University, and president of the American and Foreign Christian Union.

ALEXANDER, JAMES STRANGE (1865), banker; b. Tarrytown, N. Y. His career has been almost wholly identified with the National Bank of Commerce, New York City, in which he was chief clerk and assistant cashier from 1885 to 1907, and vice president in 1908. He was appointed president of the institution in 1911. As a prominent figure in the financial world he also became associated with a number of large organizations, holding directorships of the American Express Company, American Telephone & Telegraph Company, Prudential Insurance Company and the U.S. Rubber Company among others. France made him a Chevalier of the Legion of Honor, King Victor Emmanuel Chevalier of the Crown of Italy, and Belgium a Knight Commander of the Order of Leopold II.

ALEXANDRA, QUEEN (1844) (**ALEXANDRA CAROLINE MARIE CHARLOTTE LOUISE JULIE**), daughter of Christian IX. of Denmark, wife of Edward VII. (1863), and mother of George V.; has always taken a deep interest in the welfare of her people. After the S. African War she reorganized the army nursing service, and during the Great War emerged from the retirement in which she had lived since her husband's death, and worked devotedly on behalf of hospitals and other organizations for the relief and comfort of Brit. soldiers. *Alexandra Day*, instituted in 1912 to commemorate the fiftieth anniversary of Queen Alexandra's residence in this country, has for its object the raising of funds for hospitals, children's holiday funds, etc. Up to 1919, £700,000 had been raised by the sale of roses on that day.

ALEXANDRIA, seapt., Egypt (31° 15' N., 29° 51' E.). Modern city is built on peninsula between Mediterranean and

ALEXANDRIA

Lake Mareotis, and on Isthmus joining Pharos to mainland; fine harbour; floating dock; graving dock (opened 1905); torpedo station; good railway and telegraphic communication; handles 90 per cent. of entire Egyptian trade; exports cotton, wool, sugar, eggs, etc.; imports coal, textiles, machinery. To S. are Pompey's Pillar, catacombs cut out of hills, and Arab cemetery. Old city consisted of Brucheum (Gr. quarter) in E., Rhacotis (Egyptian quarter) in W., and Jews' quarter in N. E. In first were museum with famous library, royal residence, Cleopatra's Needles, Ptolemaic palaces, Poseidonion; in second were Pompey's Pillar, Serapeum, Necropolis. Founded by Alexander the Great, 332 B. C.; became great intellectual and commercial centre under Ptolemies; taken by Julius Caesar, 48 B. C.; suffered persecution under Caracalla, A. D. 215; taken by Persians, 616; by Arabs under Amr, 641; twice taken by Greeks; retaken by Amr, who destroyed fortifications; the city thenceforth declined; taken by Turks, 1517, under whose misrule further decayed; prosperity revived under Mehmet Ali, in 19th cent.; taken by Napoleon, 1798; by British, 1801; bombarded by British during Arabi Pasha's rebellion, 1882. During Great War, Brit. base for operations in Egypt and Gallipoli. Pop. 444,167.

Alexandrian School, name given to that later phase of Gr. culture whose centre was at Alexandria, which lasted from 4th cent. B. C. to the Mohammedan conquest of Egypt in the 7th cent. A.D. The best days of Hellenic civilization were over, and the spirit of freshness had gone out of Gr. life, but there was still an 'afterglow.' The Alexandrians were learned rather than original. Most of their work was philosophical or religious; there was a large Jewish population in Alexandria, and Gr. philosophy and Jewish monotheism approached each other, meeting in Philo. Neoplatonism, an amalgam of Platonic, Stoic, and Oriental elements, was evolved, and through Origen and Clement of Alexandria influenced Christian theology.

ALEXANDRIA, a city, port of entry and county seat of Alexandria Co., Virginia, situated on the Potomac riv., near Mount Vernon, six miles south of Washington, D.C. It is reached by the Pennsylvania and Southern railroads and by a trolley line connecting the capital with Mount Vernon. Alexandria is an old city and has a notable place in American history, figuring in both the Revolutionary and Civil wars. At one time it was thought the city would develop into a leading center of the country. It is well situated for water

ALEXEIEFF, MICHEL

traffic in having a fine harbor that will accommodate the largest ships, due to the Potomac expanding here to the width of a mile. Alexandria has long been a trade center, and produces manufactures aggregating \$20,000,000 in value annually. It has two national banks. The city is a noted center of education, its scholastic institutions including the Washington High School, Potomac, Mount Vernon and St. Mary's Academies, and the Theological Seminary and High School of the Diocese of Virginia (Protestant Episcopal). Pop. 1920, 18,060.

ALEXANDRIA, a city of Louisiana; the county seat of Rapides Parish, situated on the Red river about 192 miles northwest of New Orleans. It is a railroad center served by the Chicago, Rock Island and Pacific, the Louisiana and Arkansas, the St. Louis, Iron Mountain and Southern, and other lines. It produces cotton manufactures and cottonseed oil, and has sugar refineries and lumber yards. In its vicinity is an extensive agricultural region growing corn, rice, fruit and vegetables. The city's noteworthy structures include a conspicuous Federal building, a public library, the Elks' Home, and an opera house. Its growth, relative to size, has been marked in recent years. Pop.: 1920, 17,510.

ALEXANDRIAN CODEX, CODEX ALEXANDRINUS, copy of Gk. New Testament (almost complete) with 1 and 2 Clement; compiled in uncial script of V. cent. (Brit. Mus.)

ALEXANDRINE, IAMBIC HEXAMETER, verse of 6 feet (with caesura usually after third foot). Named from metre used in O. Fr. poems on Alexander the Great.

ALEXANDRIYA (46° 40' N.; 33° 20' E.), chief town, Kherson, Russia.

ALEXANDROPOL (40° 47' N.; 43° 45' E.), town, Transcaucasia. Pop. 35,000.

ALEXEI, MICHAÏLOVICH, ALEXIS OR ALEXIUS (1629-76), Tsar of Russia; f. of Peter the Great; a progressive ruler.

ALEXEI, PETROVICH (1690-1718); Russ. Tsarevich; s. of Peter the Great; was of a studious, unheroic disposition, and held in the greatest contempt by his f. After leading a life of terror for a number of years, A. fled to Vienna and sought the protection of Charles VI. This escapade increased his f.'s hatred, and, it having been discovered that he desired Peter's death, he was put to torture, and died.

ALEXEIEFF, MICHEL VASSILIE-

VITCH (1857-1918), one of the ablest of Russian generals; son of a non-commissioned officer; joined army in 1876; fought in Russo-Turkish War (1877-8); admitted to Superior Military School (staff academy) in 1897, and joined army staff at Petrograd; lecturer in Staff Coll.; was promoted general in 1907; quartermaster-gen. of 3rd Army in Russo-Japanese War; returned to staff duties (1906); chief of staff of Kiev military district (1908); during Great War chief of staff to Ivanov.

ALEXIUS I., COMNENUS (1048-1118), Byzantine emperor; succ., 1081; reformed administration; besought help of West against Turks, and so brought about First Crusade.

ALEXIUS II. (1167-83); Byzantine emperor; deposed by Andronicus Comnenus, and afterwards strangled.

ALEXIUS III., ANGELUS (c. 1195), Byzantine emperor; in 1203 the Crusaders, led by Dandolo, besieged Constantinople and carried it by storm. A., a weak and debauched ruler, fled into Thrace, but afterwards surrendered, and d. in a monastery at Niceæ.

ALEY, ROBERT JUDSON, (1863,) educator; b. Coal City, Ind. Beginning his career as a teacher in country schools, he later studied at and received various degrees from Valparaiso College, Ind., Indiana University, Leland Stanford, Jr. University and the University of Pennsylvania. Between 1910 and 1921 he was president of the University of Maine, and in the latter year was appointed president of Butler College, Indianapolis. He became a Fellow of the American Association for the Advancement of Science, and a member of the Academy of Political and Social Science. As an author he wrote works on geometry, arithmetic and algebra.

ALFALFA. See GRASS.

ALFIERI, VITTORIO, COUNT (1749-1803), Ital. poet; b. at Asti; becoming independent by the death of his f. and uncle, lacked any systematic training, but was interested in lit. and had a passion for travel. He had a series of love affairs, one of which got him into trouble in London. His tragedy, *Cleopatra*, was staged at Turin, 1775. He formed an attachment with the Countess of Albany lived with her in Paris and latterly in Florence. He wrote several more tragedies, which have earned for him a great reputation. His characterization is more effective than his style.

ALFONSO VIII. (1158-1214), of Castile, was the most noted of the Spanish

line; destroyed power of Almohades (1212) with body of Crusaders; founded first Span. university, Palencia.

ALFONSO X., 'The Learned' (1252-84), encouraged letters and the study of astronomy.

ALFONSO XI., 'The Avenger' (1312-50), achieved brilliant victory over African invaders.

ALFONSO XII. (1857-85), established peace at home and abroad; won love of people by his kindness; d. of phthisis, Nov. 24; was succ. by s.

ALFONSO XIII., (1886,) King of Spain; posthumous son of Alfonso XII. During regency of his mother, Queen Christina (1886-92), occurred the loss of Cuba and the Philippines to U.S. Since his accession many internal troubles; married (1906) Princess Ena of Battenberg, niece of Edward VII. of Great Britain.

ALFONSO I. (1094-1185), first of Portuguese line, famous for his battles with Moors; revered as saint by Portuguese.

ALFRED THE GREAT (848-c. 900); King of England; b. at Wantage; began campaign against Danes in Æthelred's reign; fought nine battles, 870-1; successful at Englefield and Ashdown; succ. 871; twice defeated by Danes, 871; made peace. Danes again invaded Wessex, 878, when A. retired temporarily to Athelney; raised army and defeated Danes at Edington, 878; cleared Wessex and Mercia of invaders by 879; struggle renewed, 893; after four years of varying success A. finally liberated country, and Danes gave up struggle. During peace, A. enlarged navy, founded schools, introduced juridical reforms; translated works by Orosius, Bede and Gregory.

ALGÆ, group of cryptogamous plants including the seaweeds, characterized by the absence of a differentiation into root, stem, and leaf, and by the presence of chlorophyll (*q.v.*) with or without an additional coloring matter to utilize in the presence of sunlight, the carbon contained in the carbonic acid gas (CO₂) of the atmosphere. They vary in size from microscopic forms consisting of one cell (Protophyta) (*q.v.*) to the *Macrocystis* of southern seas with fronds 700 ft. in length. The a. are a group difficult to define. Some of the simplest types are sometimes classified as Protozoa (*q.v.*), and as no line of demarcation can be drawn between them, it seems expedient to adopt Haeckel's term *Protista* to include both unicellular plants and animals. On the other hand

certain a. closely resemble a group of fungi, called *Phycomycetes* in consequence. It is established that all fungi are derived from the a. One of the most interesting discoveries in bot. was that of the lichens being found to consist of a. and fungi in close nutritive relationship or symbiosis.

ALGEBRA, a branch of math's covering a great variety of subjects, many of which are symbolic extensions of arithmetic, while others involve such special ideas that they may be regarded as practically distinct subjects.

The invention of a. probably dates back to at least 1700 B.C., but the a. of the Egyptians (among whom it probably originated) was of course very elementary. The beginnings of a. are found in the work of Diophantus of Alexandria (IV. cent.), of which only Gk. and Lat. translations remain, the original being lost. This work, probably based on those of still earlier writers, is almost the only evidence that a. was known to the Greeks. Little progress in math's was made by the Romans, but among the Hindus and Arabs many notable advances were made. The latter introduced a. into Spain, and Cordova, the capital of the Moorish empire, became famous for its learning. The first Arabian treatise on a. was that of Muhammad Ben Musa (IX. cent.). This work was subsequently translated into Italian, and as the Moorish empire waned, Italy became the leader in mathematical investigation.

ALGECIRAS, a seaport of Spain, on the west side of the Bay of Gibraltar. It has an important history but is notable chiefly in modern times for the conference held in 1900 to settle the controversy between France and Germany in regard to Morocco. See **MOROCCO**; **GERMANY** (History); **FRANCE** (History). Pop. about 14,000.

ALGER, HORATIO (1834-1899), an American writer of children's books, born in Revere, Mass. He was educated at Harvard and in 1866 settled in New York. He began the writing of boys' books in the same year and was the author of over 50 such books, which included many popular series.

ALGER, JOHN LINCOLN, (1864.) college president; b. Eaton, Quebec. He was educated at Brown's University, where he later taught mathematics. Between 1895 and 1921 he served as superintendent of schools at Bennington, Vt., and as principal of Johnson (Vt.) State Normal School, Vermont Academy, Saxton's River, and the Rhode Island College of Education.

ALGER, RUSSELL A. (1836-1907), an

American capitalist and public official, b. at Lafayette, Ohio. He served in the Civil War, rising to the rank of major general of volunteers. From 1885 to 1887 he was governor of Michigan. He was Secretary of War in the cabinet of President McKinley, in 1897. In 1902 he became United States Senator.

ALGERIA, Fr. colony, N. Africa (34° N., 3° 30' E.), bounded N. by Mediterranean, E. by Tunisia, S. by Sahara, W. by Morocco. Country divided by elevation and climatic conditions into three unequal parallel zones: (1) The Tell, undulating N. region (containing the Little Atlas) of forests and arable land; (2) Steppe region of herbaceous vegetation and of pasture land diversified by ranges of mountains; (3) The Sahara (S. of Sahara Atlas), where agriculture is possible only by irrigation in oases. Coast, 690 m.; high and rocky. Rivers nothing but torrents (*wads* or *ouades*); frequently dried up; some dammed for irrigation; in steppes they form the *Shotts* of the plains, shallow lakes where snow and rain-water gather in winter. Climate Mediterranean type two seasons—dry (summer), wet or cold (autumn, winter, spring); great variety of local climates. Algeria has great forests on the mt. slopes, containing oaks, cedars, junipers, and other trees. The cultivated plants include cereals—vast quantities of wheat, oats and barley being grown in the Tell—flax, and tobacco. Vines, olives, oranges, and other fruits are cultivated, and various vegetables grown. Olive oil is largely produced, and there are important fisheries, while horses, mules, cattle, and sheep are raised in large numbers. Minerals include iron, lead, copper, zinc, phosphates, salt, petroleum, antimony, mercury. Among exports are sheep, wool, hides, cereals, cattle, horses, fruit, olive oil, metals, phosphates, tobacco; imports textiles, machinery, paper, coal, sugar, coffee, etc. Ry. mileage is over 2,000; good postal and telegraphic communications. Chief seaports, Algiers (cap.), Bougie, Philipville, Oran, Bona.

History.—After having been conquered in turn by the Romans, Vandals, and Byzantines, Algeria was invaded by the Arabs in the 8th cent., from which time dates the establishment of Islamism. The country was ruled by Arab princes till the 12th cent., and then for a time by the Almohades. The Moors settled here in late 15th cent., after they had been banished from Spain by Ferdinand the Catholic; they applied for aid against Spain to the pirate Barbarossa, who subsequently took possession of the country. After his defeat and death his brother succeeded him, and Algeria

became a Turk. province in 1519. Later in the same cent. a great struggle took place between Spain and Turkey; but the defeat of Charles V. in 1541 ended this, and the Turks continued their career of piracy. In 1669 the Turk. Government was banished by the corsairs, who then chose a dey for themselves, Turkey perforce acknowledging Algerian independence. From time to time attempts were made by various European powers to suppress the system of piracy carried on by the corsairs, who nevertheless continued to flourish until 1830. In that year the French sent an expedition against them and seized the town of Algiers, after which the whole country gradually came under Fr. control. A stubborn revolt which broke out in 1864 was finally suppressed in 1871.

Algeria is administered by a gov.-gen., who represents Fr. Republic, and is assisted in matters of finance and taxation by a superior council and delegations. There is also a consulting council. Algeria is divided for administrative purposes into three provinces, the northern portions of which form the 'departments' of Algeria, Oran, and Constantine—together making up the 'Northern Territory'; the southern portions being called the Southern Territory. The three depts. are administered as an integral part of France, like Fr. depts., and each sends two deputies and a senator to Paris. Before the Great War Algerian military forces constituted the 19th Army Corps of the Fr. army.

The country has prospered greatly under French rule, especially in pastoral pursuits. The great strides agriculture made, notably in the fertile Tell, along the coast, has been due to France's enterprise in bringing scientific irrigation and fertilizer to the land. The ports have also been improved, 3,330 miles of good roads built, and in 1921 there were 2,228 miles of railroads. There are no navigable rivers. On the south the Atlas Mountains divides the country from the desert. The chief products are cereals and wines, with the cultivation of olives for their oil outstanding in other industries. The country's commercial activities may be gauged from the shipping, which entered its three ports, Algiers, Oran and Bona, in 1921, numbering 11,199 vessels of 9,201,437 tons. The natives so eagerly responded to France's call for military aid in the World War that in 1919 French citizenship was granted to many who had served in the army and navy. The northern territory along the Mediterranean sends one senator and two deputies to the French Parliament, but only French colonists can vote.

The country's area is 222,180 square miles and its population 1921, 5,800,974, 821,427 of whom are Europeans, mostly French and Spanish. The capital is Algiers. See MAP AFRICA.

ALGIER (36° 43' N., 3° E.), capital, Algeria, N. Africa; modern town along shore, ancient city on hill behind; good harbor. Principal public buildings: Kasbah (fortress), gov.'s and abb.'s palaces, Grand Mosque dating from XI. cent., New Mosque (from XVII. cent.), R.C. Cathedral; important coal-ling station and health resort; trades in wine and grain; court of appeal, observatory, univ., museum. A. was founded (X. cent.) by Arabs; headquarters of Barbary pirates from XVI. cent.; Emperor Charles V. attempted unsuccessfully to take city, 1541; often attacked by European nations; bombarded by British, 1816; taken by French, 1830. Pop. 206,595.

ALGOA BAY (33° 47' S., 28° 51' E.); bay, S. Africa; harbor, Port Elizabeth; Algoa means 'on the way to Goa' (q.v.), in India.

ALGOL, fixed star, β Persei, in Medusa's head, with a remarkable periodic fluctuation in brightness, which may be due to eclipses by a dark satellite. The brightness has been estimated as being seventy times that of the solar photosphere.

It is remarkable for its variability, and known as the model 'eclipsestar', because of its changes in brilliance. Algol means 'the demons' Its variations of light, which wander from 2.3 to 3.5 magnitude in a period of 2 days, 20 hours and 49 seconds, are maintained with marked regularity. The changes are ascribed to the interposition of a relatively non-luminous companion star, the pair being engaged in mutual revolution. The effect of these eclipses is to place Algol at one time as a star of the second magnitude, and at another in the fourth magnitude. It gives a helium spectrum, and is now purely white. The diameter of Algol is figured at about 1,000,000 miles and its darker satellite at 830,000 miles, with their joint mass about two-thirds that of the sun.

ALGONKIAN PERIOD, a group of widely distributed rocks, including all formations younger than archæan and older than palæozoic.

ALGONQUINS, remnant of great N. Amer. Indian family, which once occupied vast territory in Canada and U.S.A.

ALHAMBRA, THE ('red castle'), gorgeous palace of the ancient Moorish kings of Granada (Southern Spain);

ALI PASHA

begun by Ibn-ul-Ahmar (1248) and completed by Muhammad III. (1314). It is surrounded by a fortified wall, strengthened by defensive towers. The most magnificent parts remaining are the famous Hall of Ambassadors, Court of the Lions, and Court of the Fishpond. The scheme of decoration is carried out in the three primary colors and the marvellously beautiful mosaic work, the elegant lightness of the arches and columns, and the elaborate richness of its ornamentation have served to make this ruined palace one of the wonders of the world, notwithstanding that it has suffered greatly from the effects of earthquake, from Fr. vandalism (c. 1811), and from the merciless hand of Time.

ALI PASHA (1741-1822), Albanian chief, surnamed Arslan 'the Lion.' His f., the Bey of Tepeleni, was murdered when A. was fourteen, and his territories seized. He eventually recovered his f.'s possessions, and gained the favor of the Porte; app. Pasha of Jannina (1788), he became one of the most influential viziers under the Turk. rule. He was insatiably ambitious, and committed great enormities to further his ends. Having aroused the jealousy of the Sultan, Mahmud II., he was eventually assassinated. His court at Jannina attracted many travellers: Byron introduces him in *Childe Harold's Pilgrimage*.

ALIAS (in full, *alias fictus*), legal term referring to a person who has assumed a false name.

ALIBI, in law, 'to prove an alibi' is to produce evidence that the person charged with a crime was in another place at the time it was committed.

ALICANTE (38° 32' N., 0° 35' W.), province, Spain; agriculture and viticulture. Pop. 1910, c. 500,000.

ALICANTE (38° 21' N., 0° 26' W.), capital, A. province, Spain; fortified harbor; manufactures cotton, linen, cigars. Pop. 55,700.

ALIEN AND SEDITION LAWS, OR ALIEN AND SEDITION ACTS, a number of laws passed during the administration of President John Adams, which were the result of factional disputes between the Federalist and Republican party leaders. Prior to this time aliens had been required to live in the United States five years before they could be naturalized. By a new law this period was raised to 14 years. The Alien Law authorized the President, without trial to order out of the country 'any aliens he shall judge dangerous to

the peace and safety of the United States.' If they remained he was empowered to imprison them so long as public safety might require. The Sedition Law, provided fine and imprisonment for combining to oppose measures of the Government, and for 'any false, scandalous or malicious writing against the Government, or against its high officials.' These laws were never put into force and were repealed shortly after.

ALIEN ENEMY. At the outbreak of the World War the position of enemy aliens within the belligerent countries became an acute problem. Inflamed public opinion saw in every alien a potential spy, and during the first few months of the war many innocent persons suffered. All countries adopted strict regulations for the internment or deportation of enemy aliens, and their property was sequestered.

In the United States, even before actual participation in the war, aliens of German and Austrian birth were extremely active in spreading propaganda and also in more forceful measures. These took the form of the blowing up of munition plants and bridges, and the attempted destruction of ships carrying munitions and food to England and France. When war was formally declared with Germany, German aliens in the United States were at once interned and their property which amounted to over half a billion dollars, was taken over by the United States and placed in the hands of the Alien Property Custodian who, wherever possible, transferred the property to American citizens. The property of Americans in Germany was likewise taken over by the German government. The treaty of peace between Germany and the United States provided for an adjustment of the property rights of the citizens of both countries, but there still remained in the hands of the Alien Property Custodian, in 1923, German property valued at over \$250,000,000, which awaited adjudication.

ALIEN IMMIGRATION. See IMMIGRATION.

ALIEN PROPERTY CUSTODIAN. See ALIEN ENEMY.

ALIENIST, psychiatrist, specialist in mental diseases. See INSANITY.

ALIMENTARY CANAL. See DIGESTION.

ALIMONY.—On the commencement of divorce proceedings it is usual for the wife to apply for an order on her husband for maintenance during and after the suit. The former is called

ALIMONY

alimony pendente lite, and continues until the decree absolute; the latter, *permanent alimony*. An order will not be made where the husband has little or no means, and if he is destitute and his wife has means, he may apply for an order on her.

ALIZARIN ($\text{C}_6\text{H}_4(\text{CO})_2\text{C}_6\text{H}_3(\text{OH})_4$ 1-2.), dyestuff formerly prepared from madder root, now synthetically from anthracene; crystallizes in red prisms, M.P. 290° , produces Turkey reds, purpurin, and other dyes (q.v.) with different mordants.

ALIZARINE COLORS. See **ANILINE DYES**.

ALKAHEST, the imaginary 'universal solvent' of the alchemists.

ALKALI, a chemical compound, such as soda and potash and the caustic hydroxides of the 'alkali metals,' sodium, potassium, lithium, cesium, rubidium, having the property of neutralizing an acid. A's turn a red litmus solution blue and phenolphthalein red.

ALKALINE EARTHS, originally, the oxides of barium, calcium, magnesium, strontium, and beryllium; the term is frequently applied to the metals themselves. The chlorides and nitrates are soluble in water, while the carbonates, sulphates and phosphates are usually insoluble.

ALKALOIDS, organic substances, especially those occurring naturally in plants, designated organic bases. They have a very energetic action on the nervous systems of animal life and hence formed a very important element in early medicine, being powerful poisons in larger doses. They are usually limited to a group of basic nitrogenous principles in plants, being found more often in the dictyledons, rather than in the leafy plants, and more especially in the fruits and seeds or in the bark. They have, in a somewhat low degree, the characteristic alkaline properties of vegetable colors and may be recognized by a bitter, acrid taste. They are especially pronounced in the poppy plant; in opium, strychnine, or in henbane, in the nicotine of tobacco, the piperine of black pepper, and the caffeine of coffee. The presumption is that they have developed in plants as a protection, poisonous to devouring animals. Alkaloids are usually solid, non-volatile, crystalline bodies, a few, like nicotine, being liquid. They are seldom soluble in water. Over two hundred kinds of alkaloids have so far been isolated, and new ones are frequently being discovered.

ALLAHABAD ($25^\circ 26' \text{ N.}, 81^\circ 50' \text{ E.}$), capital, United Provinces, India; at confluence of Jumna and Ganges; fort built by Akbar, 1575; univ.; great annual fair and center of pilgrimage. Pop. 155,970.—Allahabad ($25^\circ 45' \text{ N.}, 80^\circ 15' \text{ E.}$), district; produces grain, cotton. Pop. 1,500,000.

ALLEGHENY, river rising Potter co., Pa., U.S.A.; joins Monongahela at Pittsburgh, forming Ohio.

ALLEGHENY MOUNTAINS. See **APPALACHIAN MOUNTAINS**.

ALLEGIANCE, the duty which a subject owes to his Sovereign, or liege. Self-expatriation in the U.S. has long been allowed.

ALLEGORY is an extended metaphor. Notable examples of the a. are Spenser's *Faerie Queen* and Bunyan's *Pilgrim's Progress*.

ALLEN, CHARLES HERBERT (1848); banker; b. Lowell, Mass. In 1881 he entered political life as a member of the Massachusetts House of Representatives and also served in the Senate. From 1885 to 1889 he was a member of Congress. He was assistant secretary of the Navy between 1893 and 1900, succeeding Theodore Roosevelt in that post, and thereafter went to Porto Rico as its governor for two years. In the business world he became identified with a number of large banking organizations as a director and was president of the American Sugar Refining Company.

ALLEN, ETHAN (1739-89); Amer. soldier; took part in taking of Ticonderoga (1775); captured during raid in Canada; wrote *Narrative of Colonel Ethan Allen's Captivity* (1779).

ALLEN, FRED HOVEY (1845); clergyman and author; b. Lyme, N. H. After graduating at Hartford Theological College, he studied at Boston University, Berlin, Vienna and Paris. Early in his career he edited and in part founded the *Lawrence (Mass.) Eagle*, and became proprietor and editor of the *Suffolk County Journal*, Boston. In 1874 he entered the Congregational ministry and occupied the pastorates of a number of churches of that denomination in Massachusetts up to 1902. He was also a lecturer on art topics. He wrote various works on French and German art, great cathedrals and modern paintings, and edited biographies of Columbus, Cortez and Pizarro. American and European scenery were among other subjects of his pen.

ALLEN, HENRY J. (1868); statesman and publisher; b. Warren co., Pa. After

ALLEN, HENRY

studying at Baker University and Washburn College, Kansas, he entered the newspaper profession as editor of the *Manhattan Nationalist* and duly acquired the ownership of several daily newspapers in the smaller cities of Kansas, notably the *Wichita Daily Beacon*. As a Republican he became identified with politics as secretary to Governor Stanley of Kansas, and was himself elected governor of that state in 1918, where he organized the home communication service of the American Red Cross during the World War. Taking office in 1919, he served as governor for two terms, from that year to 1922, being re-elected in 1920. During his tenure as governor of Kansas he became of national note for the energetic part he took in meeting a fuel emergency in Kansas caused by the coal strike of 1919, and for his vigorous support of the State Industrial Court, created by the legislature to prevent labor disputes.

ALLEN, HENRY TRUEMAN (1859), an American soldier, born in Sharpsburg, Ky. He was educated at the Peekskill Military Academy, at Georgetown College, and the United States Military Academy, graduating from the latter in 1882. He at once entered active service, reaching the rank of lieutenant-colonel in 1912. He was appointed colonel in 1916 and brigadier-general in 1917. In the same year he became a major in the National Army. He saw service in the Philippines and in Mexico, and was appointed Commander of the 90th Division, A.E.F., in September, 1917. With this division he took part in the St. Mihiel and Meuse-Argonne offensives. He became Commander of the 8th Army Corps in November, 1918, and of the 9th Army Corps in April, 1919. In July of the same year he was appointed Commander of the American forces of Germany and remained in that position until the final removal of the American forces, in January, 1923. For his administration of his difficult post, General Allen won the praise, not only of the German people with whom he came in contact, but from the Allied officials as well. He received many decorations for military service and for his work in geographical exploration. He wrote *Military System of Sweden*.

ALLEN, IDA COGSWELL BAILEY (1885), lecturer and writer on diet; b. Danielson, Conn. She graduated as a dietitian at the Metropolitan Hospital, New York City, and served in that capacity in several like institutions and as director of domestic science at the Worcester (Mass.) Y.W.C.A. She became known as a contributor of art-

ALLEN, WILLIAM

icles on dietetics to various magazines; and for her lectures under the auspices of the Chautauqua Institution and the U.S. Food Administration. In 1918 she wrote books on wheat, meat and sugar substitutes. She married Thomas Lewis Allen in 1912.

ALLEN, JAMES EDWARD (1876); college professor; b. Hebron, Va. After studying at the University of Virginia and Johns Hopkins University, he became an instructor in languages or principal of various schools in Virginia and Maryland. In 1910 he was appointed president of the Davis and Elkins College, West Virginia, after serving for several years in that institution as professor of French and German.

ALLEN, JAMES LANE (1849); an American writer, b. near Lexington, Ky. Educated in Transylvania University, where he taught for some time, becoming, subsequently, professor of Latin and English in Bethany College. His fame as a writer rests chiefly upon his novels and short stories describing the manners and people in the blue grass regions of Kentucky. These include *Summer in Arcady*, *Choir Invisible*, *The Cathedral Singer*, and *The Emblem of Fidelity*.

ALLEN, VIOLA, actress. She was b. in the South and educated in Boston, Toronto and New York. At the age of 15 she made her stage debut at the Madison Square Theatre, New York, and played Shakespearian and other roles with actors of fame, including Lawrence Barrett, Salvini and Joseph Jefferson. She also played leading roles in a series of widely popular plays, among them R. C. Carton's *Liberty Hall*, Sidney Grundy's *Sowing the Wind*, Henry Arthur Jones' *Masqueraders*, and Hall Caine's *The Christian*. Later she returned to Shakespearian impersonations, starting with distinction in *Twelfth Night*, *A Winter's Tale*, *Cymbeline*, and *As You Like It*. In 1906 she married Peter Duryea.

ALLEN, WILLIS BOYD (1855); author; b. Kittery Point, Maine. Graduating from Harvard in 1878, he studied at Boston University, receiving the degree of LL. B. in 1881, and practiced law for several years in Boston. Later he took up authorship and wrote a number of books on travel and outdoor subjects, among them the *Mountaineer* series (5 vols.), and *Forest Home* series. His works also include poems, novels, stories of adventure and books on Alaska.

ALLEN, WILLIAM FRANCIS (1830-89), Amer. scholar; text-books on classical lit.; edited *Collection of Slave Songs* (1867).

ALLEN, WILLIAM HARVEY (1874), social service direction; b. LeRoy, Michigan. He was educated at the Universities of Chicago and Pennsylvania and studied at Leipzig and Berlin. In the field of social welfare he became affiliated with the New York Association for Improving the Condition of the Poor as general agent, between 1903 and 1907, then directed the Bureau of Municipal Research and the Training School for Public Service. He was appointed director of the University of Wisconsin's Survey in 1914, and of the Institute for Public Service the following year. As a social service worker he also undertook school, municipal and state surveys in various sections of the country. His writings embraced subjects relating to his field of work, such as school efficiency, civics and health, woman's part in government, and training for citizenship and public service.

ALLENBY EDMUND HENRY HYNMAN, VISCOUNT (1861). Eng. soldier, served in Bechuanaland (1884-5), Zululand (1888), S. Africa (1899-1902); inspector of cavalry (1910); in Great War he did valuable work with cavalry in retreat from Mons (1914) and in battles following, and was appointed commander of 5th Army Corps; in 1917 he was promoted to command the 3rd Army in the battle of Arras; as commander-in-chief of the Egyptian Expeditionary Force he planned the capture of Beersheba (Oct. 1917), and carried through the great movement that eliminated Turkey from the war; administrator of Egypt; field-marshal (1919); viscountcy and grant of \$250,000 (Aug. 1919).

ALLENSTEIN. See TANNENBERG.

ALLENTOWN, a city of Pennsylvania, in Lehigh Co., of which it is the county seat. It is an important industrial community and has iron and steel mills, wire works, silk works, and furniture and shoe factories. It is the seat of Muhlenberg College. It is on several railroads and on the Lehigh River and canal. Pop. 1920, 78,502; 1923, 87,329.

ALLIANCE, an act of combination between States, parties, and others, for their general defense or benefit. Notable examples of international a's have been: The Triple Alliance (1688) between Gt. Britain, the Netherlands, and Sweden against Louis XIV.; the Grand Alliance (1689); the Quadruple Alliance (1814) directed against the power of Napoleon; the Holy Alliance (g.v.) between Russia, Austria and Prussia (1815); the Triple Alliance (1872) organized by Bismarck between Germany, Austria, and Russia, from

which Russia withdrew in 1886, its place being taken by Italy; Balkan Alliance (Bulgaria, Serbia, Greece and Montenegro), 1912. The Alliance of Great Britain, France, Italy, Belgium and other countries against the Central Powers and Turkey was the most notable alliance of recent times.

ALLIANCE, a city of Ohio, in Stark co., on the Mahoning river, about 58 miles to the southeast of Cleveland. The railroads serving it are the Alliance and Northern and the Pennsylvania. It is a manufacturing city with foundries producing drop forgings, steam hammers, boilers and farm implements, and also has white lead plants and terra cotta potteries. Its region is agricultural. Among its scholastic institutions is the Mount Union College (Meth. Epis.). Pop. 1920, 21,608.

ALLIANCE FRANÇAISE, Federation de L', a combination of societies, organized in 1902, in the United States and Canada for the purpose of promoting the study of the French language, literature, arts and history. Its work is directed by twenty directors, which compose a council meeting five times yearly to supervise the affairs of the Federation. In the United States and Canada there were, in 1923, over 60 groups or circles which sent delegates to the annual conventions held in various cities.

ALLIANCE ISRAELITE, UNIVERSSELLE, an organization founded in Paris, in 1860 for the general benefit of Jews throughout the world. Its purpose includes the emancipation of Jews from oppressing laws and political disabilities. The movement spread rapidly and became a powerful agent for the betterment of the Jews. Schools were established in many parts of Europe and Asia. Farm schools were also established in Palestine and normal schools for teachers are maintained in Paris. The Alliance publishes monthly bulletins and semi-annual reports, together with reports on special studies on subjects relating to its work.

ALLBONE, SAMUEL AUSTIN (1816-89). Amer. author; compiled *Critical Dictionary of English Literature*, 1854-71.

ALLIED AND ASSOCIATED POWERS, the designation given to the Powers which opposed the Central Powers of the World War. It was adopted after the entry of the United States into the war. This country was never formally an ally but was careful to designate itself as an associated power, and it is so referred to in all the formal treaties and other documents relating to the war.

ALLIES, THE, the Confederate Powers (Britain, Russia, Prussia, Austria, etc.), who restored the Bourbons in France (1814-15). The name given also to the countries combined against the Central Powers and Turkey in the World War.

ALLIGATOR, animal living in American rivers, resembling the crocodile except in having a more stumpy head and the fourth tooth of the lower jaw fitting into a pit, not a notch, in the upper jaw. The largest a., attaining a length of 20 ft., is the caiman of the Amazon. The small a. *sinese* occurs in China rivers.

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ALLOTROPY (chem.), the faculty of existing in several conditions with different properties (e.g.), carbon occurs as diamond and graphite as well as in an amorphous condition. Different forms of organic substances of the same constituents are termed *isomeric*.

ALLOWAY (56° 20' N., 4° 39' W.); hamlet, on Doon, Ayrshire, Scotland; birthplace of Burns; famous 'haunted kirk' and 'Auld Brig'; Burns' cottage and monument.

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ALLEN, WILLIAM HARVEY (1874), social service direction; b. LeRoy, Michigan. He was educated at the Universities of Chicago and Pennsylvania and studied at Leipzig and Berlin. In the field of social welfare he became affiliated with the New York Association for Improving the Condition of the Poor as general agent, between 1908 and 1907, then directed the Bureau of Municipal Research and the Training School for Public Service. He was appointed director of the University of Wisconsin's Survey in 1914, and of the Institute for Public Service the following year. As a social service worker he also undertook school, municipal and state surveys in various sections of the country. His writings embraced subjects relating to his field of work, such as school efficiency, civics and health, woman's part in government, and training for citizenship and public service.

ALLENBY EDMUND HENRY HYNMAN, VISCOUNT (1861). Eng. soldier, served in Bechuanaland (1884-5), Zululand (1888), S. Africa (1899-1902); inspector of cavalry (1910); in Great War he did valuable work with cavalry in retreat from Mons (1914) and in battles following, and was appointed commander of 5th Army Corps; in 1917 he was promoted to command the 3rd Army in the battle of Arras; as commander-in-chief of the Egyptian Expeditionary Force he planned the capture of Beersheba (Oct. 1917), and carried through the great movement that eliminated Turkey from the war; administrator of Egypt; field-marshal (1919); viscountcy and grant of \$250,000 (Aug. 1919).

ALLENSTEIN. See TANNENBERG.

ALLENTOWN, a city of Pennsylvania, in Lehigh Co., of which it is the county seat. It is an important industrial community and has iron and steel mills, wire works, silk works, and furniture and shoe factories. It is the seat of Muhlenberg College. It is on several railroads and on the Lehigh River and canal. Pop. 1920, 73,502; 1923, 87,329.

ALLIANCE, an act of combination between States, parties, and others, for their general defense or benefit. Notable examples of international a's have been: The Triple Alliance (1882) between Gt. Britain, the Netherlands, and Sweden against Louis XIV.; the Grand Alliance (1689); the Quadruple Alliance (1814) directed against the power of Napoleon; the Holy Alliance (g.v.) between Russia, Austria and Prussia (1815); the Triple Alliance (1872) organized by Bismarck between Germany, Austria, and Russia, from

which Russia withdrew in 1886, its place being taken by Italy; Balkan Alliance (Bulgaria, Serbia, Greece and Montenegro), 1912. The Alliance of Great Britain, France, Italy, Belgium and other countries against the Central Powers and Turkey was the most notable alliance of recent times.

ALLIANCE, a city of Ohio, in Stark co., on the Mahoning river, about 58 miles to the southeast of Cleveland. The railroads serving it are the Alliance and Northern and the Pennsylvania. It is a manufacturing city with foundries producing drop forgings, steam hammers, boilers and farm implements, and also has white lead plants and terra cotta potteries. Its region is agricultural. Among its scholastic institutions is the Mount Union College (Meth. Epis.). Pop. 1920, 21,008.

ALLIANCE FRANÇAISE, Federation de L', a combination of societies, organized in 1902, in the United States and Canada for the purpose of promoting the study of the French language, literature, arts and history. Its work is directed by twenty directors, which compose a council meeting five times yearly to supervise the affairs of the Federation. In the United States and Canada there were, in 1923, over 60 groups or circles which sent delegates to the annual conventions held in various cities.

ALLIANCE ISRAELITE, UNIVERSELLE, an organization founded in Paris, in 1860 for the general benefit of Jews throughout the world. Its purpose includes the emancipation of Jews from oppressing laws and political disabilities. The movement spread rapidly and became a powerful agent for the betterment of the Jews. Schools were established in many parts of Europe and Asia. Farm schools were also established in Palestine and normal schools for teachers are maintained in Paris. The Alliance publishes monthly bulletins and semi-annual reports, together with reports on special studies on subjects relating to its work.

ALLIBONE, SAMUEL AUSTIN (1816-89). Amer. author; compiled *Critical Dictionary of English Literature*, 1854-71.

ALLIED AND ASSOCIATED POWERS, the designation given to the Powers which opposed the Central Powers of the World War. It was adopted after the entry of the United States into the war. This country was never formally an ally but was careful to designate itself as an associated power, and it is so referred to in all the formal treaties and other documents relating to the war.

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ALL-RED' ROUTE

in the IV. cent. At Rome, on May 13, the festival of the Blessed Virgin and the Martyrs was celebrated by order of Boniface IV. in 609 or 610, but the modern commemoration probably does not arise from this but rather from the consecration of a chapel in St. Peter's for the apostles, saints, martyrs, and confessors in 731.

'ALL-RED' ROUTE, the name given to a proposed accelerated service to New Zealand and Australia via Canada, brought forward by Sir Wilfred Laurier at the Imperial Conference (1907). It was contended that, besides the advantages of a quicker carriage of passengers and mails, it would result in securing a considerable amount of Canadian traffic which now goes by New York; it would give Great Britain the control of the Pacific trade; would strengthen her position both in the Atlantic and Pacific; and would furnish a means of protecting her trade in time of war. It was at first stated that the subsidy required would be £400,000; but this estimate was later increased to £1,000,000. The proposed subsidy would be provided jointly by Great Britain, Canada, New Zealand, and Australia. At the Imperial Conference (1911) an attempt to carry the proposal was unsuccessful. Mr. Asquith remarked that the opening of the Panama Canal might affect the scheme; while Mr. Lloyd George suggested that the difficulties in the way were almost insuperable, and suggested reference to the Royal Commission on Imperial Trade.

ALLSTON, WASHINGTON (1779-1843), Amer. poet and artist; became intimate with S. T. Coleridge, whose portrait he painted (National Gallery); pictures chiefly on religious subjects.

ALLUVIUM, soil deposited by running water. The deltas of rivers like the Mississippi, Nile, Ganges, Hwang-Ho, consist of a. Alluvial soils are extremely fertile, while some contain gem-stones or gold.

ALMA MATER ('kindly mother'), term applied by Romans to goddesses, Ceres, Cybele, etc.; by students to their univ. or college.

ALMAGRO, DIEGO D' (1475-1538), Span. military adventurer; leading member of the Darien colony; was associated with Pizarro in scheme for conquest of Peru; subsequently coming into conflict with Pizarro, he was captured and put to death.

ALMANAC, tables or books containing a calendar, together with astronomical and statistical data, such as the

ALMOHADES

times of the rising and setting of the sun and moon, of eclipses and the tides, and market days, terms of courts, ecclesiastical and other holidays, economic statistics of different countries, also genealogical and literary matter, etc. Many a's contain prophecies as to meteorological phenomena and political events. Primitive a's were compiled by the ancients, but the earliest manuscript a. probably originated in the XII. cent. Among modern almanacs some of which show an interesting development from older astrological calendars, are *Old Moore's A.*, the *British A.*, *Whitaker's A.*; *Ephemeris and Nautical A.* issued by the chief governments.

ALMANSUR (fl. 754-775), second caliph of Abbasides dynasty; of a cruel and treacherous nature, but a patron of learning; persecuted the Egyptian and Syrian Christians; had Euclid's *Elements* trans. into Syriac.

ALMA-TADEMA, SIR LAURENCE (1836-1912), naturalized Brit. artist; b. Dronrip, Netherlands; studied at Antwerp; subjects taken largely from classical and mediæval sources; also many portraits; A.R.A. (1876); R.A. (1879); knighted (1899); O.M. (1905).

ALMA-TADEMA, MISS LAURENCE, author, daughter of the British artist, the late Sir L. Alma-Tadema. Her writings include poems, plays, novels, short stories, essays and translations of *Maeterlinck*. She gave readings in the United States on the meaning of happiness and on other subjects in 1907 and 1908. In 1915 she became the joint founder with I. J. Paderewski of the Polish Victims Relief Fund, and in 1918 she was made a Companion of the Order of the British Empire.

ALMEIDA (40° 44' N.; 6° 57' W.), town, Portugal; old fortress.

ALMEIDA, DOM FRANCISCO DE (c. 1450-1510), Portug. Viceroy of the Indies; fought against the Moors for Ferdinand and Isabella; superseded in India by Albuquerque (q.v.); killed by natives at Table (Saldanha) Bay. His s. Lorenzo discovered Madagascar.

ALMERIA (37° 17' N., 2° 25' W.); province, Spain; area, 3360 sq. miles; silk, grapes, iron and lead mines. Pop. 497,000.

ALMERIA (36° 51' N., 2° 31' W.); cathedral town and seaport, Spain; formerly flourishing Moorish town and pirate headquarters; exports fruit. Pop. 48,000.

ALMOHADES, name given to line of Muhammadan princes, started by

ALMOND

Muhammad ibn Tumart in XII. cent., in revolt from current Muhammadan anthropomorphism. After his death, 1128, the movement was carried on by 'Abd-el-Mumin'. The A. conquered Spain and N. Africa, and lasted till XIII. cent.

ALMOND (*Amygdalus communis*), small tree closely allied to plum, cherry, and peach, the pulpy exocarp of the latter fruits being replaced by a tough dry coat; the kernel representing the stone or seed. Bitter, Jordan a's, and other varieties have developed from the same species. Both the sweet and the bitter a's contain a fixed oil and a ferment emulsion which acts on the glucoside amygdalin to form prussic acid. The chief medicinal value of a's is that they may be converted into flour for palatable cakes, replacing starchy food in cases of diabetes.

ALMONER, officer in an almshouse; a title of dignity in old Fr. court. In England now there is a hereditary Grand A., lord high a., sub-a. Almonry, place in church or elsewhere where alms were given. The royal a. in England is an official of King's household.

ALMOVIST, KARL JONAS LUDWIG (1793-1866), Swed. writer; pub. many novels, poems, and educational treatises; of very unstable character; charged with forgery and murder (1851), and fled to America. Wrote series of novels. *The Book of the Thorn-Rose* (1832-35).

ALNWICK (55° 24' N.; 1° 43' W.), town, Northumberland; early became borough and market town; old gateway and Norman arch; often besieged by Scots, XI.-XV. cent.'s; castle held six cent.'s by Percies (q.v.); breweries, tobacco trade. Pop. 7,000.

ALOE, genus of African plants, order *Liliaceae*, with a rosette of large juicy pointed spine-margined leaves, cultivated as ornamental plants. Preparations of the juice are used medicinally as a purgative and an emmenagogue. Its principle is aloin (C₁₅H₁₈O 3H₂O).

ALOST, tn., E. Flanders (50° 57' N., 4° 3' E.); was center of hop trade; linen, silk, and cloth; bombarded and destroyed by Germans (1914). Pop. 36,160.

ALPACA, breed of camel-like ungulates, like the llama and vicuna, probably derived from the guanaco, with fine long, woolly hair, domesticated in Peru and Bolivia. The name is applied both to the hair and the cloth manufactured from it. The latter often contains silk or cotton, and much of the fabric sold as a is mohair.

ALPS

ALPENA, a city of Michigan, the county seat of Alpena co., on Thunder Bay, Lake Huron, in the northern section of the State. It is served by the Detroit and Mackinac railroad. Its situation in the vicinity of numerous lakes makes it an attractive popular resort, and it is also notable as a fishing center. The city's industrial activities embrace lumbering, tanning, and the production of paper, cement, etc. Pop. 1920, 11,101.

ALPES MARITIMES (43° 49' N., 7° 10' E.), department, France; area, 1482 sq. miles; Fr. Riviera; many health resorts—Nice, Cannes, etc.; produces fruit. Pop. 375,000.

ALPHA (chem.), first of group of compounds; (astron.), prefixed to Constellation, one of brightest stars therein.

ALPHA AND OMEGA, the first and the last letters of Gk. alphabet.

ALPHA RAYS. See RADIOACTIVITY.

ALPHABET, term applied to collection of symbols used to express various sounds that occur in a language. It is derived from *alpha beta*, the two first letters of the Gk. language. There can be no doubt that pictures were first employed to indicate words; that these pictures became indistinct with the lapse of time, and that at a later period the sounds of words were reduced to their simplest forms or symbols. Even at the present day some languages have symbols only for words—the Chinese, for example. The Egyptian hieroglyphics were also pictorial, and indicated words. Whatever people the a. may have originated with, there can be little doubt that it evolved a form much as we now know it with the Phœnicians, and passed from them to the Greeks. The earliest alphabetic evidence to which a date can be assigned belongs to the earlier part of the IX. cent. B.C. This is the 'Moabite Stone,' recording the exploits of Mesha, King of Moab. It was discovered in 1868, and is now in the Louvre.

ALPHEUS (37° 35' N., 21° 52' E.), river, Peloponnesus; flows into Ionian Sea; in Gk. myth. A. was a river god who pursued Arethusa (q.v.).

ALPHONSO See ALFONSO.

ALPS, crescent-shaped mt. system, France, Italy, Switzerland, Austria, and Bavaria (46° N., 7° E.); total length, c. 700 m.; breadth, 30-160 m.; area, c. 80,000 sq. m.; topographically divided into (1) W. Alps (Col di Tenda to Simplon), including Maritime Alps, Cottian Alps, Dauphiné Alps, Graian

Alps, chain of Mont Blanc, Pennine Alps; (2) Central Alps (Simplon to Reschen, Scheideck and Stelvio), including Bernese Alps, N. Swiss Alps, Lepontine and Adula Alps, Todi group, Rhaetian Alps; (3) E. Alps (Reschen, Scheideck and Stelvio to the Semmering), including Ortler, Adamello, and Bretna groups. Limestone Alps of Bavaria, N. Tyrol and Salzburg, Central Tyrolean Alps, S. Tyrolean Alps (Dolomites), S.E. Alps (Carnic, Karawanken, and Julian Alps). Divided according to height into *Fore Alps*, *Middle Alps*, *High Alps*; snow-line varies from 3,900 ft. on S. side to 9,200 ft. on N.; glaciers of upper valleys descend to 4,000-5,000 ft. above sea-level—Aletsch, 4,400 ft.; Gorner-Boden, 5,250 ft. Best-known peaks of Western Alps—Gran Paradiso (13,320 ft.), Mont. Blanc (15,775), Dent du Midi (10,690); of Middle Alps, Matterhorn (14,775), Monte Rosa (15,215), Strahlhorn (13,745), Mischabelhorn (14,935), Aletschhorn (13,770), Jungfrau (13,670), Monch (13,460), Finsteraarhorn (14,020), and Schreckhorn (13,380). Drained by Rhine and tributaries. Them, Aar, Reuss, Limmat; Danube and tributaries, Iller, Lech, Isar, Inn, etc.; Po and tributaries, Dora Riparia, Ticino, Mincio, Adige, etc. Rhone with Arve, Isere, Durance; and smaller streams flowing to Adriatic and Ligurian Sea.

Chief Passes: Great St. Bernard, E. of Mont Blanc to Rhone; Mont Cenis, by Dora Riparia N.W. to Arc and Osere; Simplon from Maggiora to Brieg; St. Gothard, from Ticino to Upper Reuss valley; Brenner from Adige to Innsbruck. There are railways crossing by Col dell'Altare; Mont Cenis, tunnel over $7\frac{1}{2}$ m. long, opened 1871; Simplon, two parallel tunnels, opened 1906; St. Gothard, tunnel over $9\frac{1}{2}$ m. long, opened 1882; Arlberg, opened 1884; Brenner, opened 1867, series of twenty-seven tunnels; Semmering, opened 1853. Several non-snowy peaks have tourist railways up their slopes; the only snowy peak with one is Jungfrau. Highest villages, Juf (6,998 ft.) in Grisons, L'Ecot (6,713) in Savoy, St. Vêran (6,726) in Dauphiné, Trépalé in Ital. Alps (6,788), Ober Gurgl (6,322), and Fend (6,211) in Tyrolean Alps.

Geology.—The geological history of the Alps is one of successive periods of upheaval, due to pressure from the N. W. and S.E., which have folded, broken up, and in some cases overturned the strata of the earth's crust. In the center of the range the rocks are chiefly Archean—gneiss granite, mica schist, etc.; while the outer belts contain principally fossiliferous sedimentary strata. Minerals abound in Austrian part of range, where

coal, iron, lead, gold, silver, copper, and mercury are worked.

Climate naturally varies with altitude. Alps may be divided according to climate into six regions. (1) At base of mountains in N. Italy are sheltered districts producing olives, which require mean temp. of 42° F. in winter, and in summer continuous heat of at least 75° F. (2) In deep valleys and farther up on sunny slopes are regions producing vines, which require mean temp. in summer of 68° F. (3) Mountainous or deciduous; the region extends to about 4,000 ft. above sea-level on northern side and sometimes to 5,500 on S.; snow lies several months, spring and summer warmer than in N. Europe. (4) Sub-alpine or coniferous tree region, from 4,000 to 5,500 or 6,000 ft. above sea-level on N., to 7,000 ft. on S. (5) Alpine region, between tree limit and permanent snow. (6) Glacial region of permanent snow, where there is intense frost at night, and often temp. of 80° F. by day.

Flora.—The distinctive Alpine plants include gentians, saxifrages, rhododendrons, primulas, edelweiss; general characteristics are dwarfish woody stems, large flowers, woolly texture.

Fauna includes bouquetin, marmot, chamois, white hare, fox, lynx, wild-cat, wolf, bear; vultures, eagles, ptarmigan, grouse, etc., are found.

History.—Little known of early inhabitants except names of few tribes conquered by Augustus; various Teutonic tribes invaded and occupied districts in 5th and 6th cents., and Franks also occupied them transiently. History becomes traceable only in 10th and 11th cents., with break-up of Carolingian empire. Struggle for Western Alps was carried on between Savoy, Dauphiné, and Provence; subsequently between Savoy and France, latter ultimately obtaining whole of western slope. In central region occurred gradual establishment of Swiss Confederation, 1291-1815. Eastern district was connected historically with Habsburgs, who obtained northern slope of E. Alps in 15th cent., and subsequently gained Ampezzo Valley (1517), Venetia (1797), and other districts on southern slopes; but lost Milanese and Bergamasca to Savoy in 1859, and Venetia in 1866. In 1919 the Dolomites and Ortler were transferred to Italy.

The Alps have been very thoroughly explored since the beginning of the 19th cent. Previous to that Mont Blanc had been ascended, and about sixty-five glaciers were known. Jungfrau and Finsteraarhorn were conquered in 1811 and 1812 respectively; and henceforth

mountaineering greatly increased, many Alpine clubs being established.

ALSACE-LORRAINE, now **HAUT-RHIN**, formerly an imperial terr. of the Ger. Empire, but since the Peace of Versailles (1919) a prov. of France (47° 25' 49" 31' N., 5° 47' 8" 9' E.). Alsace includes the W. half of the Rhine valley and E. half of the Vosges Mts. Lorraine, which lies N.W. of Alsace, consists of a low plateau drained by the Saar in the E., and the Moselle in the W. Cereals, potatoes, sugar-beet, flax, tobacco, hemp, fruit, and wine (3,900,000 gal.) are the principal products. Forests all state-owned, occupy 30 per cent. of total area. Fisheries are valuable. Minerals—coal, iron, salt, and building stone—are concentrated in Lorraine. Prior to the World War Germany's wealth of iron ore amounted to 2,800 million tons, of which Alsace-Lorraine contained 2,000 million tons. Potash deposits extremely valuable; previous powerful monopoly of this substance by Germany now at an end. Chief industries are iron smelting and founding, and the manufacture of machinery; textiles, glass, porcelain, chemicals, and paper. There are 1,320 m. of railways and a number of canals—Rhine-Marne, the Rhine-Rhone, and the coal canal of the Saar. Largest towns are Strasbourg (the cap.), Mulhouse, Metz, and Colmar.

For two thousand years Alsace-Lorraine has been a hot-bed of European strife. It was occupied by the Romans for four hundred years, and by the time it was claimed by the Holy Roman Empire it had acquired the Franco-German duality of language which still exists. Devastated during the Thirty Years' War, it was restored to France (1697), but was lost to Germany in 1871. By the Peace of Versailles (1919) it again became French.

Fighting in Alsace-Lorraine.—While the main forces were still mobilizing on either side, the French carried out a military raid into Upper Alsace a few days after the outbreak of the World War. On Aug. 7, 1914, they occupied Altkirch, 12 m. across the frontier; on Aug. 8, Mulhouse; but German reinforcements coming up, they retired. Two days later General Pau (Alsace) and Castelnau (Lorraine) began a general offensive from Nancy to Belfort. The passes of the Vosges were occupied; in the S. Mulhouse was retaken; and French columns were pouring down the eastern slopes almost as far as the Rhine. Saarburg was entered on the 18th, but two days later the Germans struck hard from the region of Metz, and the French left was heavily defeated and routed. The northern passes were lost, but from

the Col du Bonhomme S. the French remained within Ger. territory. At the beginning of 1915 they were on the heights above Munster, and farther S. had established an advanced post on the Hartmannswellerkopf and had taken Thann. Severe fighting developed near Mulhouse; Hartmannswellerkopf was lost and retaken several times; but, though continued with intervals for several months, the attacks realized little success. Both sides settled down to the routine of trench warfare, varied occasionally by raids.

ALSATIA (48° 20' N.; 7° 20' E.); old name for Alsace. It was also the name given to the Whitefriars district, London, which, till 1697, was a debtors' sanctuary and haunt of thieves.

ALSBERG, CARL LUCAS (1877); biologist and chemist; b. New York. He was educated at Columbia, receiving in 1900 the M.D. degree of the College of Physicians and Surgeons of that university; and also studied at the universities of Strassburg and Berlin. Later he taught physiological and biological chemistry at Harvard and was an investigator at the U.S. Bureau of Fisheries. From 1908 to 1921 he performed further scientific work for the government as chemical biologist of the Bureau of Plant Industry and as chief of the Bureau of Chemistry. In 1921 he became director of the Stanford Food Research Institute.

ALTAI (50° 50' N.; 85° E.); mountains, Siberia and Mongolia, Asia; separate Semirychensk, Russia, from E. Turkestan, and outline Gobi Desert on N. Kolyvan A. or Sallughem chain extends N. E. from A. proper to Sayan range. A. proper stretch E. in two parallel ranges to Gobi. Latter constituted chiefly of gneiss and Archaean rocks; former of granites, schists, slate, with Carboniferous and Devonian deposits. Flora includes alpine and herbaceous plants. Minerals include gold, silver, copper, zinc, lead. Inhabitants engage in agriculture. Chief town, Barnaul. Pop. c. 800,000.

ALTAIR, name in astronomy for a Aquila, the brightest star in constellation of *Aquila*.

ALTAMAHA (31° 40' N.; 81° 54' W.); navigable river, Georgia, U.S.

ALTAMURA (40° 49' N.; 16° 33' E.); town, Italy. Pop. 25,000.

ALTAR.—Wherever sacrifice has been offered a's are found; they exist, therefore, in most of the world's religions. Catholicism has its sacrifice of the mass, but in Protestantism, especially where, as in Calvinism, its eucharistic theory is

furthest removed from Catholicism, there is no *a*. In ancient Egypt a large block, often granite, served as an *a*. According to *Exodus* 20, 'In every place where I record my name I will come unto thee, and I will bless thee'. An *a*. was not to be of hewn stone. When the Temple was built its sacrificial ritual required an *a*. for burnt-offering and an *a*. of incense. In Greece and Rome *a*'s were places of sanctuary. In the Christian Church wooden tables were used at first for the Holy Communion. More elaborate *a*'s appear only in the III. cent. In the R.O. Church the *a*. consists of supports, the super-*a*. or slab, and a cavity for relics. The *a*. or *a*-stone (a stone let into the super-*a*.) must be consecrated.

In the Eng. Church the term *a*. was expunged from the Prayer Book of 1552; but it has always been retained in the Coronation service, and since the Oxford movement it has come into use again.

ALTAZIMUTH (Lat. *altus*, high; Arabic, *as-sumuth*, a way, a road), an instrument used for finding the altitude and azimuth of a celestial body. The eye-piece of the instrument contains a micrometer, made by stretching spider web across the field of view.

ALTDORF (46° 52' N., 8° 39' E.), town, Lake Lucerne, Switzerland; cradle of Swiss liberty; associated with William Tell (q.v.) Pop. 3,500.

ALTENA (51° 18' N., 7° 40' E.), town, Prussia; manufactures hardware. Pop. c. 15,000.

ALTENBURG (50° 59' N., 12° 25' E.), cathedral town, capital of former Duchy of Saxe-A., Germany; scene of Prinzen-raub. Pop. 45,000.

ALTENDORF, suburb of Essen (q.v.), Germany, with dwellings of Krupp employees.

ALTENSTEIN, castle near Eisenach, Saxe-Meiningen, Germany. Luther seized in neighbourhood, 1521

ALTERNATORS, ELECTRICAL. The alternator, or alternating-current dynamo, is a machine for supplying electrical energy in the form of an alternating electric current, in exchange for some form of mechanical energy supplied to it. The principle on which alternators work depends upon the fact that when a circuit of wire is made to rotate in a magnetic field between two magnetic poles, the electric current thus set up in the wire flows in one direction during the first half of the revolution, and in the opposite direction during the second half of the revolution. In actual practice the energy producing rotation is supplied by

a steam engine or other mechanical contrivance. Instead of one wire many turns of wire are wound round the armature of soft iron which is introduced to strengthen the magnetic field. To supply the current to the external circuit the ends of the armature coils are connected to collecting rings. These rings revolve with the armature, and bear copper or carbon brushes that pick up the current and transmit it to the terminals of the machine, whence it is distributed. Alternators are particularly useful where a large output is required.

ALTHOUSE, PAUL SHEARER (1869), operatic tenor; b. Reading, Pa. He was the first American tenor without European training to make a debut in a leading role at the Metropolitan Opera House, New York, where he appeared in 1913 as Dimitri in *Boris Godunov*. Other operas in which he took part as a leading tenor included *Aida*, *Cavalleria Rusticana*, *Pagliacci*, *Carmen*, *Tosca*, *Faust* and *Thais*. He also became a prominent figure at musical festivals and orchestral concerts throughout the U.S.

ALTIMETER, an instrument used for taking altitudes, such as a quadrant or sextant.

ALTITUDE, a perpendicular elevation of a point above a given level; (astron.), the apparent angular elevation of a heavenly body above the horizon, called true *a*. when it is corrected for refraction and dip of the horizon; (geom.), the perpendicular distance from the base of a figure to the summit or vertex, as in a triangle, pyramid, etc.

ALTMAN FOUNDATION, a body incorporated in 1913 to administer funds accruing from the estate of Benjamin Altman, one of the leading merchants of New York City. The general purpose of the Foundation is to benefit 'the charitable, benevolent, and educational institutions within the State of New York'. A new chair of fine arts was established by the Foundation at New York University, in 1922.

ALTO (It., high), or counter-tenor in men, is the highest pitch in the male voice; contralto in women and boys is the lowest pitch of the voice.

ALTON, a city in Madison County, Ill.; situated on the Mississippi River, seven miles above the mouth of the Missouri and 25 miles north of St. Louis, Mo. It is on the Chicago & Alton and the Chicago, Burlington & Quincy railroads and is the Illinois terminal of the Missouri & Illinois railroad. Of considerable importance as a manufacturing center, it produces glassware, tools, cartridges, castings, strawboard, sewer pipe, oil

ALTONA

products, mine cars, etc. It is also the distributing point of a large amount of farm products raised in its vicinity. Among local institutions are 14 public schools, three parochial schools, two daily papers, two national banks, three savings banks, a military academy and a girls' seminary. Pop. 1920, 24,682, including industrial suburbs, about 30,000.

ALTONA (53° 34' N., 9° 57' E.), town, Germany, on Elbe, close to Hamburg; fine docks; trades with Britain, France, America; burnt by Swedes, 1713; Prussian since 1866; joined Zollverein, 1888. Pop. 1919, 169,000.

ALTOONA, a city in Blair county, Pa., 114 miles east of Pittsburgh, among the eastern foothills of the Alleghenies, important because of the shops of the Pennsylvania R. R. located here, which cover 234 acres and employ 17,000 workers. Aside from that there are 45 other independent industrial plants, manufacturing silk, bar iron, bricks, motor trucks, garments, tile, etc. Numerous bituminous coal mines are located in the adjoining region. The city has over 80 churches, three banks, four trust companies, three daily papers and spends over \$300,000 a year on its schools. Since 1914 it has been under a commission form of municipal government. Pop. 1920, 60,331; est. 1924, 70,000.

ALTSCHULER, MODEST (1873), a Russian-American musician, b. in Mogilev, Russia. He graduated from the Warsaw Conservatory in 1886 and later studied in the Imperial Conservatory in Moscow. After serving a year in the Russian Army, he came to the United States, in 1896. Here he later organized the famous Russian Symphony Orchestra with which, as its leader, he toured the country. Of recent years he has been a conductor of popular concerts in New York City.

ALUM ($K_2SO_4 \cdot Al_2(SO_4)_2 \cdot 24H_2O$), potash alum, is a colorless salt crystallizing in octahedra, used as a mordant in dyeing and in medicine as an astringent and styptic. The term is also applied to salts in which potassium may be replaced by any of the other alkali metals or ammonium, and aluminium by ferric iron or chromium. The most important minerals from which a. is obtained are a. schist, alunite, bauxite, and cryolite.

ALUMINA. See ALUMINIUM.

ALUMINIUM (Al=27), bluish silver-white, malleable, ductile trivalent metallic element of low sp. gr. (c.2.6) and high conductivity of heat and electricity, m.p. about 700°. It is widely distributed, but only in compounds constituting

ALUNITE, ALUMSTONE

about 7 per cent. of the earth's crust. Its principal minerals are the silicates kaolin, felspar, and mica, and cryolite (Na_3AlF_6), corundum (Al_2O_3), bauxite ($Al_2O_3 \cdot 2H_2O$), alunite $KAl_2(SO_4)_2(OH)$, diaspore ($AlO.OH$). Davy was able to obtain an iron alloy by the electric decomposition of alumina (aluminium oxide Al_2O_3) with an iron wire in 1809 and called the element 'aluminium,' but it was first isolated by Wohler in 1827, by reducing the chloride with potassium. With the cheapening of electric power it has become possible to obtain aluminium on a commercial scale. The Hall-Héroult process, now in general use, consists of electrolyzing alumina (obtained from bauxite), dissolved in molten cryolite in an iron 'cell' lined with carbon, the cast-iron bottom and the already reduced aluminium forming the cathode connected with the negative pole of the dynamo, and adjustable carbon rods dipping into the mixture forming the anode. Large aluminium works have been established at the Falls of the Rhine (Neuhausen and Rheinfelden), Niagara Falls, and the Falls of Foyers. The metal is becoming used more and more extensively for parts of engines, in boat-building, for cooking utensils, parts of airships and aeroplanes, for various electrical and scientific apparatus, as a substitute for lithographic stones, and together with powdered iron oxides in the thermite process of welding and soldering. Numerous alloys of aluminium have been manufactured, which are being increasingly employed on account of their greater strength and hardness (e.g.) magnalium (aluminium and magnesium) and aluminium bronzes (copper and 2.5 to 10 per cent. aluminium).

The great amount of heat developed by the combustion of aluminium has led naturally to proposals for its use in explosive compositions, because, although the product of combustion (Al_2O_3) is a solid, the gases produced from other ingredients of the explosive composition would be raised to such a high temperature that great pressure must result. Ammonal is a well-known example of an explosive containing aluminium. An intense white light is produced when aluminium burns, so that it is used in flash-light compositions for photographic purposes, or for illuminating compositions for rockets or star shells.

ALUMNUS, originally foster-son, or male pupil; graduate of coll. or univ.

ALUNITE, ALUMSTONE ($KAl_2(SO_4)_2(OH)_2$), colorless or white mineral occurring in volcanic rocks in Hungary, Italy, and New S. Wales, sometimes

crystallized in rhombohedra.

ALVA or **ALBA, DUKE OF, FERN-ANDO ALVAREZ DE TOLEDO** (1508-83), Span. statesman and soldier; fought at *Pavia*, in Hungary, Algiers; commander-in-chief when thirty; cr. duke as reward for defence of N. Spain; fought in Italy against pope and French, 1556. A. is notorious for his Netherlands campaign (1567-73); set up the 'Bloody Council' and boasted of executing 18,000 men. He had unlimited power; imposed heavy taxes; executed Counts Egmont and Horn, Prot. leaders. Holland and Zealand destroyed his fleet, and he left for Spain; d. after fierce campaign against Don Antonio of Portugal.

ALVARADO, PEDRO DE (1495-1541), Span. conquistador; chief officer under Cortes in conquest of Mexico; gov. of Guatemala.

ALVEOLUS (zool.), pit or cavity, as the socket of a tooth, the terminating part of a gland, or a cell of a honeycomb.

ALVAREZ, DON JOSE (1768-1827), an eminent Spanish sculptor, b. at Priego, Cordova. He first worked with his father, a stonemason, and obtained admission into the Academy of Granada, 1788. He was appointed principal sculptor to the King of Spain, 1825. He executed statues for Napoleon and for Ferdinand VII., and died in Madrid. A scene in the *Defence of Saragossa* and a group of *Antiochus and Memnon* are two of his chief works.

ALVERSTONE, RICHARD EVERARD WEBSTER, 1ST BARON (1842-1915), Lord Chief Justice of England; thrice Attorney-General under Lord Salisbury; represented Gt. Britain in Bering Sea arbitration (1893) and the Alaska Boundary Commission (1903); engaged in Parnell Commission (1888-89); Master of the Rolls (1900); raised to peerage (1900).

ALVORD, CLARENCE WALWORTH (1868), an American university professor, b. in Greenfield, Mass. After graduating from Williams College, in 1891, he studied for three years in the University of Berlin and the University of Chicago. From 1897 until 1901 he was instructor in the Preparatory School of the University of Illinois, specializing in American history. From 1920 he was professor of history at the University of Minnesota. He is the author of *The Mississippi Valley in British Politics* (2 vols., 1917); *The Illinois Country* (1919), and numerous state histories of Illinois, Wisconsin and Missouri. He was editor-in-chief of the *Illinois Centennial History*.

ALWAR (27° 40' N., 76° 30' E.), state, Rajputana, India; area, 3200 sq. miles. Pop. 1921, 708,982. Capital, *Alwar* (27° 34' N., 76° 35' E.), has palaces. Pop. 44,782.

AMADEO, GIOVANNI ANTONIO (1447-1522), Ital. sculptor and arch.; famed for statues in the Colleoni chapel, Bergamo; was also engaged in designing Milan cathedral.

AMADEUS I. (1845-90), Span. king, elected, 1870; Duke of Aosta, 2nd s. of King Victor Emmanuel, Italy; tried to rule constitutionally and failed because of factions; almost assassinated, 1872; abdicated, 1873.

AMADEUS V., THE GREAT (1249-1323), Count of Savoy; famed for his wisdom and military exploits.

AMADEUS VIII. (1383-1451), Duke of Savoy; extended his dominions, but subsequently retired to monastery; elected pope as Felix V., but was not recognized by Church.

AMADIS OF GAUL, famous mediæval cycle of romance, especially popular in Iberian Peninsula, and similar in style to the Arthurian and Charlemagne cycles; earliest existing version is by Vasco de Lobeira (early XV. cent.); Eng. version by Southey. Amadis, 'the Knight of the Lion,' represents the type of the devoted lover and knight-errant who is caricatured in *Don Quixote*.

AMADOU (Fr.); spongy substance obtained from species of the fungus *Polyporus*; used as tinder after having been soaked in a solution of saltpetre.

AMALARIC (d. 531), King of Visigoths; m. Clotilda, dau. of Clovis, King of Franks.

AMALEKITES, tribe inhabiting district to S. of Judah; hereditary foes of Israelites; crushed by Saul and David.

AMALFI (40° 38' N., 14° 36' E.), port and abb.'s see on N. of Gulf of Salerno, Italy; of great importance in Middle Ages, ruled by its own Doges, and a formidable rival to Venice, Genoa, and Pisa; much injured by sea in XII. and XIV. cents.; now of little commercial importance. Pop. 7000.

AMALGAM, alloy of mercury with other metals, which is liquid or solid according to the proportion of mercury; A's are used for silvering mirrors, and for tooth-cements; also in process of extracting gold and silver from ore, and for frictional machines.

AMALIA I. Anna, Duchess of Saxe-Weimar-Eisenach (1739-1807), b. at Wolfenbüttel, the daughter of the Duke

of Brunswick-Wolfenbützel. Married Duke Ernest Augustus of Saxe-Weimar-Eisenach, and at his death in 1758 became regent for seventeen years of her son, Carl August. 2. Elizabeth, Landgravine of Hesse-Cassel (1602-51). The granddaughter of William I., Prince of Orange. In 1619 she married William V., Landgrave of Hesse-Cassel, and after his death in 1637 ruled for many years as regent with great energy and wisdom.

AMALRIC I., King of Jerusalem (1162-74), continued long and fierce struggle for the possession of Egypt, of which Saladin ultimately became king.

AMALRIC II., King of Jerusalem (1197-1205); reign likewise disturbed by frequent conflicts with Muhammadans.

AMANA (41° 44' N.; 91° 51' W.), township, Iowa, U.S.; site of A. Society, Ger. communistic religious association, founded 1885.

AMARA. See **KUT-ET-AMARA**.

AMARILLO, a city of Texas, in Potter co. It is on the Fort Worth and Denver City, the Atchison, Topeka and Santa Fe, the Chicago, Rock Island and Gulf, and other railroads. It has important agricultural and manufacturing interests. Pop. 1920, 15,495.

AMARNA, a tn. of Egypt, situated on the Nile between Memphis and Thebes. It has many remarkable ruins, among which are the ruins of a temple built by Amenophis IV. In 1887 about 300 clay tablets were found inscribed with letters from the King of Egypt to Babylon, Assyria, and other powers.

AMARYLLIS, a shepherdess in classical poetry.

AMASIA (40° 37' N.; 35° 54' E.), town, Asia Minor; once capital of Pontus. Pop. 25,000.

AMASIS I. (XVI. cent. B.C.); King of Egypt, founder of XVIII. dynasty; successful warrior.

AMASIS II. (570-526 B.C.); last king to retain the crown of Egypt; an able ruler; his s. Psammetichus III. was dethroned by the Persians.

AMATEUR, one who engages in an art, game, or physical exercise, for pleasure and not for gain. The A. Athletic Association defines an a. as 'one who has never competed for a money prize or staked bet, either with or against a professional for any prize, or who has never taught, pursued, or assisted in the practice of athletic exercises as a means of obtaining a livelihood.'

AMATI, ANDREA (c. 1530-1611), founder of the Cremona school of violin-makers; his bro., Nicola, and his sons, Antonio and Girolamo, were also distinguished makers. The most famous craftsman of the family was *Nicola A.* (1596-1684), S. of Girolamo; maker of the 'grand Amati' violin; one of his pupils was Antonius Stradivarius; Nicola's violins are valued at anything up to \$3000.

AMATO, PASQUALE (1879) Italian baritone, b. in Naples, was educated for the profession of civil engineering, but instead of practicing, studied three years in Naples Conservatory. He made his debut in the Bellini Theatre, Naples, as Germont, in 1900, with such success that he secured contracts for touring Italy, Germany, England, Egypt and South America, later becoming the leading baritone at La Scala Theatre, Milan. His first appearance in the U.S. was at the Metropolitan Opera House, New York City, in November, 1908. Among the important parts he has created are Jack Rance, in *The Girl of the Golden West*; Carlo Worms, in *Germania*; and King Hadriot, in *Armide*.

AMAZON, AMAZONS, chief river of S. America, rising in the Peruvian Andes in two great branches, the Ucayali and the Marañon, which unite at Nauta, in N.E. of Peru, after which the river flows over 3200 miles right across Brazil, entering the Atlantic at the equator. The width increases from under two miles at the Brazilian boundary to fifty at the principal mouth; it is navigable for ocean steamers for about 2300 miles, and for smaller vessels about 180 miles farther. Trade is carried on by the A. Steam Navigation Company and by numbers of small steamers employed by rubber companies. The region it drains, an area of over 2,700,000 sq. miles, produces rubber, cotton, indigo, nuts, sugar, cacao, coffee, tobacco; and its course leads through vast impenetrable forests, where there are many natural channels which unite the different affluents. It is a rapid river, especially in times of flood; its waters abound in hundreds of kinds of fish, and great numbers of turtles are found. A great deal of silt is carried down, and has formed many islands, particularly near the mouth.

The principal ports are Tabatinga, on Peruvian boundary, Tefe, Manaos, Obidos, Santarem, Macapa, in Brazil; and the chief trading city is Para, near the mouth. The A. has about 200 tributaries, many of which are navigable. Besides Ucayali and Marañon the principal affluents are the Napo, Putumayo, Yapura, Negro from the N., and the Javary, Jurua, Purus, Madeta, Tapajos,

AMAZONAS

and Xingu from the S. Napo rises on N. side of Cotopaxi; its affluents include the Coca and Aguatico. Putumayo, or Ica, rises near Pasto and joins A. at Sao Antonio. Yapura flows parallel to Putumayo, rises in Columbian Andes, and joins A. by several natural channels.

Negro is principal northern affluent of A. rises in Colombia, is joined by Branco, Uapes, and other streams, and unites with A. below Manaos. Javary forms part of boundary between Brazil and Peru, and unites with Marañon at Tabatinga. Jurua rises in Peru and is sluggish stream. Purus also rises in Peru, is joined by Acre or Aquiri, and unites with A. in lat. 4°S. Madeira is largest tributary of A.; its head waters, the Beni and Marmoré, rise in Bolivia and unite in lat. 10°30' S.; in the upper reaches are many rapids; its affluents include the Blanco, Guapore, Mayutata, and it joins A. near Santarem. Xingu rises in Matto Grasso, has many falls and rapids, and forms lake near the mouth, uniting with A. by multitude of streams. Of the smaller tributaries, the Trombetas, Nanay, Tigre, Pastaza, and Morona may be mentioned, all on the S. side. The Tocantins is sometimes called a tributary of the A., but is not in reality.

AMAZONAS (6° S., 78° W.), department, Peru. Pop. 70,000.

AMAZONAS (2° 30' S., 61° W.), state, Brazil; capital, Manaos; rubber, cacao, nuts. Pop. 499,450.

AMAZONS (i.e. breastless), legendary race of warlike women dwelling in Pontus; said to have cut or burnt off right breast that they might use their weapons more freely; men were not admitted to their dominions, but once yearly they met with the Gargareans in the mountains for the propagation of their race; male offspring were destroyed, or sent back to their fathers. See **PENTHESILEA** and **HIPPOLYTA**.

AMBALA, the name of a dist. of Northern India and the chief city therein. Here was ratified, in 1869, the treaty between Lord Mayo, governor-general of India, and the Emir Shere Ali of Afghanistan. The tn. has many fine public buildings.

AMBASSADOR, highest of four classes of diplomatic agents recognized by congresses of Vienna (1815) and Aix-la-Chapelle (1818). All empires, kingdoms, grand duchies, and more important republics accredit and receive ambassadors (Brazil received recognition for its adhesion to the Allies during World War). Highest envoys of Holy See also accorded ambassadorial rank.

AMBROSE, ST.

Ambassadors deemed personal representatives of heads of their states; have right of direct negotiation with head of state, and exemption from civil and criminal jurisdiction of state to which accredited. Proposed ambassador must be acceptable to receiving state. U.S. dismissed Lord Sackville (1888) and Dr. Dumba (1915). Modern tendency to appoint men of more than diplomatic experience (e.g.), U.S. ambassadors to Britain; Lord Bryce, Lord Reading, Lord Grey, Sir Auckland Geddes (1920) to U.S.

AMBATO (1° 10' S., 78° 50' W.), town, Ecuador. Pop. c. 10,000.

AMBER (C₁₀H₁₀O), yellow, brown, or reddish translucent resin becoming electrically charged by friction, in Oligocene strata in E. Prussia, Miocene deposits in Sicily, Burma, and elsewhere, widely distributed evidence of extinct pine forests, and washed up by the sea on the foreshores of the Baltic, North Sea, and Mediterranean.

AMBERG (49° 28' N., 11° 50' E.), town, Bavaria. Pop. 26,000.

AMBERGRIS, a grey or blackish odorous fatty substance, volatilising as a white vapour at c. 100°, found as a morbid concretion in the intestines of the sperm whale, or in masses from ½ oz. to 150 lb. in weight floating in tropical seas; extensively used in the East for perfumery and pharmaceutical purposes.

AMBOISE (47° 45' N., 1° E.), town, Indre-et-Loire France; famed for its historic castle, where Charles VIII. was b. and d., and Abd-el-Kader imprisoned, 1848-52; also for the Huguenot conspiracy directed against Francis II., when 1200 of the inhabitants lost their lives; and for the 'Edict of A.' 1563, by which Catherine de' Medici made concessions to the Protestants. Pop. 4,632.

AMBOYNA OR AMBOINA (3° 45' S., 128° 15' E.), town, island, and residency, Dutch E. Indies; town has fishing and agricultural industries. Pop. 8000. Island (most important of Moluccas), volcanic; produces cloves, spices, cocoa, fruit. Pop. 39,000. Residency includes numerous islands. Pop. 300,000.

AMBROSE, ST. (c. 340-97), Father of the Church; s. of prefect of Gallia Narbonensis; b. at Trèves; rose to be consular prefect of Liguria and Emilia; not yet baptized, he was made bp. of Milan, 374, on death of Auxentius; episcopate marked by Gothic inroad and brief flight to Illyricum; pres. of synod at Aquileia, 381, to consider Arian heresy; controversy with Rom.

Symmachus (*q.v.*), who was one of last pagans; resisted Valentinian's effort to enforce Arianism on Rome; remained under usurpation of Maximus; rebuked Emperor Theodosius for bloodshed at Thessalonica, 390; fled on success of Eugenius, 392; gifts of administration and strenuous ascetic ideals; great writer of hymns; but *Te Deum* wrongly ascribed to him.

AMBROSIA, a term used by the ancients to designate the food of the gods, while their drink was called nectar. The word signifies 'immortal,' and a. was said to be able to bestow immortality on mortals, as in the case of Thetis and Berenice. A. was also applied to wounds in story, and used as an unguent for the hair.

AMBROSIA, mediæval religious brotherhood established in neighborhood of Milan; also name of Anabaptist sect in XVI. cent.

AMBULANCE, a moving hospital following an army in the field, and treating the wounded and sick until they can be removed back to more permanent establishments. The term is also commonly applied to wagons for the conveyance of sick and wounded. Military a's were introduced to a certain extent by Napoleon I., but those according to modern ideas were instituted in the American Civil War, and have proved of the greatest value in every subsequent war. In war, according to the U. S. organization, the wounded are collected by regimental bearers at the firing line and carried to the collecting station, whence they are taken to the dressing station by bearers of the Field Army Medical Corps, and then if necessary to the field hospital. Operations are carried out both at the dressing station (if urgent) and at the field hospital. The Red Cross Society and other charitable societies are associated with the military authorities in modern warfare.

AMENHOTEP, name borne by four Pharaohs of Egypt of the 18th dynasty, which began with the son of Amasis or Aahmes I. (c. 1570 B.C.), and ended after 1375 B.C. with grandson of Thothmes IV.

AMERICA (71° N. to 54° S., 35° to 170° W.), two continents (connected by Isthmus), Western hemisphere; comprises North, South, and Central America; total area, c. 16,000,000 sq. miles; total pop. c. 170,000,000; named after the navigator, Amerigo Vespucci (*q.v.*) who followed up Columbus.

North America (15° to 85° N., 55° to 170° W.) is bounded N. by Arctic

Ocean, N.E. by Smith Sound, Baffin Bay, Davis Strait; S.E. by Atlantic; S. by Caribbean Sea, Gulf of Mexico, and Central A.; W. and S.W. by Bering Strait, Bering Sea, Pacific. Extreme length is c. 4500 miles; width, c. 3300 miles; area, c. 8,300,000 sq. miles. Continent expands broadly in N. and tapers to the S. Coast-line is much indented. Surface consists of great lowland region in center, drained by large rivers; in E. are highlands and in W. high mountain ranges. Principal Mountains in W. are the Rockies, and a parallel range known as Sierra Nevada in California and as Cascade range farther north; chief peak of Rockies, Mt. Blanca, of Sierra Nevada, Mt. Whitney; and in E. Appalachian Mountains, highest peak, Mount Mitchell. Principal Rivers are St. Lawrence in E., Yukon, Fraser, Columbia, Colorado in W., Mississippi-Missouri, Peace-Mackenzie, Saskatchewan-Nelson draining central plains and flowing respectively to Gulf of Mexico, Arctic, and Hudson Bay. Chief Lakes are Great Bear, Great Slave, Athabasca, Deer, Wollaston, Winnipeg in Canada; Superior, Michigan, Huron, Erie, Ontario, between Canada and U.S.A. Chief Islands are Newfoundland, Cape Breton, Anticosti, Prince Edward's Island, off Quebec and New Brunswick; Vancouver, Queen Charlotte Islands, Prince of Wales Island, Aleutians, off W. coast; some of West Indies in S.

Climate varies; has great extremes. There are vast forests of pine, beech, oak, hickory, ash, sycamore, chestnut, and other trees; enormous quantities of wheat, corn, barley, millet, rice, potatoes, peas produced; many fruits cultivated; sugar, coffee, cotton, cocoa, vanilla grown. Minerals include coal, iron, gold, silver, copper, lead, salt, petroleum.

Political Divisions are Greenland in N.E., Dan. colony; Dominion of Canada, which includes all British North American possessions except Newfoundland, in northern half; United States of America and Mexico in southern half; Alaska (*q.v.*) in N.W. corner belongs to U.S.A. Pop. c. 120,000,000.

Central America (8° to 21° 30' W., 77° 30' to 92° 50' W.), unites North and South A.; extreme length, c. 1000 miles; breadth, 70 to over 300 miles; area, c. 210,000 sq. miles; bounded N. by Mexico, E. by Caribbean Sea, S. and W. by Pacific. Northern part is mountainous, with steep slope to Pacific, and tableland, intersected by valleys, sloping more gradually to Atlantic; narrow southern part is mountain from sea to sea. Chief Mountains are the Sierra Madre in Guatemala, Cordillera de Yolaina in Nicaragua, Sierra de Tilaran

in Costa Rica, Chiriqui range in Panama; many volcanoes, including Fuego, Tacana in Guatemala, Cosequina in Nicaragua, Chiriqui in Costa Rica. Principal Rivers are Segovia, Patuca, Ulua, Grande, Motagua, San Juan. Chief Lakes are Nicaragua, Amatitlan, Atitlan, Managua, Izabel. Political divisions are British Honduras in N.E. and the independent states of Guatemala, Honduras, Salvador, Nicaragua, Costa Rica and Panama. Climate varies according to elevation; earthquakes frequent. In tropical belt, rubber, mahogany, cacao occur; coffee and grain are largely produced; other products are sarsaparilla, tortoise-shell, fruits, indigo, hides. The people are of Indian or mixed Span. and Ind. race. Pop. c. 5,000,000.

The West Indies lie to the E. of Central A., between North and South A. They include Cuba and Haiti, which are independent republics, the Bahamas, Barbados, Trinidad, Jamaica, Leeward, and Windward Islands, which belong to Britain.

South America (12° 25' N. to 56° S., 35° 15' to 81° 20' W.) is bounded N. by Caribbean Sea, N.E. by N. Atlantic, E.S.E. by S. Atlantic, W. by Pacific. Extreme length is c. 4750 miles; breadth, c. 3200 miles; area, 7,500,000 sq. miles. Whole of W. side is occupied by mountains, upland valleys, and plateaus of Andes (*q.v.*) from the N. of which an offshoot curves round by the N. side of the Orinoco. Along the S. side of the lower Orinoco, and eastward, is the plateau of Guiana; and in E., between mouth of Amazon and Rio de la Plata, is Plateau of Brazil. Rest of surface consists of great plains—wooded selvas and grassy pampas. N. is drained by Colombian Magdalena and Orinoco, N. center by Amazon and its tributaries and Tocantins; extreme E. projection by San Francisco River; S. center by Paraguay, Parana, Uruguay, and their tributaries. Coast-line little broken except at river mouths. See MAPS NORTH AMERICA, SOUTH AMERICA.

Climate is generally temperate and equable. There are enormous forests, those in tropical regions having magnificent trees and flowering plants. Fruits grown include oranges, pine-apples, guavas, mangoes, bananas; quassia, cinchona, taploca, vanilla, indigo, cacao, sugar-cane also produced. Minerals include gold, silver, diamonds, copper, iron.

Political divisions are the republics of Colombia, Venezuela, Ecuador, Brazil, Peru, Bolivia, Chili, Argentina, Paraguay, Uruguay; colonies of British, Dutch and French, Guiana in N.E.;

Falkland Islands in S.E. belong to Britain. Pop. c. 45,000,000.

Geology of America.—Rocky Mountains in North A. and Andes in South A. were formed by upheavals of Tertiary period, and are thus comparatively recent; Appalachians in North A. are of Palaeozoic or early Mesozoic formation; E. Brazilian highlands in South A. and Adirondacks in North A. belong to Archæan period. From similarity between rocks on eastern coasts of A. and those on western coasts of Europe and Africa, and from existence of submerged mountain range running through Atlantic, it is believed that the Atlantic was formed by a rift valley.

Races.—Arctic regions of North A. are inhabited by Eskimos, a yellow race, who live chiefly by fishing and seal-hunting; they are short, fat, with black hair and brown skin. Their origin has not been authoritatively established. Aboriginal inhabitants of remainder of continent were Indians; these are generally tall and well developed, with black hair and high cheek-bones. They are called 'red Indians' from the copper-colored skin of certain tribes. Best-known tribes are the Sioux in the western plains, the Iroquois in Canada and elsewhere, the Araucanians and Patagonians in South A. In Mexico and Central A. the people are chiefly creoles and half-breeds; in Brazil are large numbers of negroes and mulattoes, while the South American pampas are the home of a mixed race called the Gauchos. There are many negroes in U.S.A. The European inhabitants of North A. are chiefly of Brit., Ger., and Scandinavian descent, those in South A. of Span. and Portug. descent.

Native Customs, etc.—Aborigines, both Eskimos and Indians, lived by hunting; former had underground huts or tents made of hides, latter inhabited skin wigwams; had only stone and wooden weapons, metal tools being unknown before coming of white men. Tribes were generally governed on clan system; most tribes practiced polygamy, and women had considerable amount of power. Art was not unknown, and in intervals between hunting expeditions some tribes executed fine carvings on ivory. Women did sewing with sinew for thread, with which they made skin garments. Eskimos wore trousers and upper garments; in warmer regions short skirts were worn by women and breech cloths by men. They ornamented themselves by tattooing and painting, and warriors often had fringe of scalps adorning their garments.

General History.—Norsemen reached Greenland about X. cent., and visited the adjacent coast of America. No trace

AMERICA CUP

of their occupation remains, and America may be said to have been first discovered by Columbus, who reached the Bahamas in 1492. He afterwards made further discoveries, 1493-1504, in South America and the West Indies, but the further development of these regions was carried on principally by Span. and Portug. explorers. Brazil was discovered and annexed by the Portuguese in 1500; and the Spaniards conquered Peru in 1524-33, Chili in 1540-53, and eventually became masters of practically whole of South A., except Brazil. Struggles occurred intermittently with other European powers, the English, Dutch, and French all making attempts to acquire territories in the South; the only dominions they permanently acquired, however, were the colonies of British, French, and Dutch Guiana. Brazil remained under Portug. control until 1822, when it established itself as an independent empire; it became a republic in 1890. The Span. dominions were controlled by the mother country till XIX. cent., but they rose in revolt in 1810; long struggles ensued, but by 1826 they had all attained independence, and the Span. forces were finally expelled from the country in that year.

Central America was discovered by Columbus in 1502, and the whole region was subdued by Spain by 1525, remaining under Span. rule as the Captaincy-General of Guatemala until 1821, when independence was declared. The five states, Guatemala, Salvador, Nicaragua, Costa Rica, and Panama, united as the federal republic of Central A. in 1823, which, however, only lasted until 1839. All except Costa Rica were reunited for three years, from 1842 to 1845; and since then several unsuccessful attempts at union have been made. British Honduras became a Brit. colony in 1850.

In *North America* Newfoundland was probably discovered by John Cabot, who in 1497 commanded an expedition to the eastern shores of North A. About 1500 Labrador was reached by Cortereal, Florida in 1513 by Leon, Mexico and Central America were subdued by Spaniards in 1521-23. French made colonies in Canada, and English along E. coast in XVII. cent. Settlement was made by English in Virginia in 1607; others were established in Maryland, Pennsylvania, and Massachusetts, where the Pilgrim Fathers settled in 1620. By 1750 all the seaboard between Florida and Canada belonged to England, who further acquired Canada from France in 1759. Amer. colonies rebelled in 1775, and became independent as U.S.A. in 1783.

AMERICA CUP, yachting trophy for international competition, has been

AMERICAN FED. LABOR

held by the New York Yacht Club since 1857. Notable attempts to recover it for Britain were made in 1870, 1885, 1887, 1893, 1895 (Lord Dunraven's *Valkyrie v. Defender*); also by Sir Thomas Lipton in 1899 (*Shamrock v. Columbia*), 1900 (*Shamrock II. v. Columbia*), 1903 (*Shamrock III. v. Reliance*). Race was resumed in 1920; Brit. representative, Sir Thomas Lipton's *Shamrock IV.* See YACHTING.

AMERICAN ACADEMY OF ARTS AND LETTERS. See ACADEMY OF ARTS AND LETTERS, AMERICAN.

AMERICAN ACADEMY OF POLITICAL AND SOCIAL SCIENCE. See ACADEMY OF POLITICAL AND SOCIAL SCIENCE, AMERICAN.

AMERICAN AGRICULTURE. See AGRICULTURE.

AMERICAN COLLEGES AND EXPERIMENT STATIONS, ASSOCIATION OF. See AGRICULTURAL EDUCATION.

AMERICAN FEDERATION OF ARTS. See ARTS, AMERICAN FEDERATION OF.

AMERICAN FEDERATION OF LABOR, the largest confederation of trades unions in the world, formed in 1881 as an outgrowth of the National Labor Union, the Knights of Labor and a number of sectional orders. The organization embraces the United States, Canada, Porto Rico and Panama. Its purposes include: the encouragement and formation of local trades and labor unions; the closer federation and combination of such bodies; the securing of legislation in the interest of the working masses; the establishment of national and international trade unions, based upon a strict recognition of the autonomy of such trade; the sale of union-labor goods; the influencing of public opinion by peaceful and legal methods in favor of organized labor; aiding and encouraging the labor press of America; and as a federation, promoting the harmonious co-operation of all national and international trades unions so that they may be helpful to each other.

The federation's powers are prescribed much as the Federal Government's are in its relations with the States. All rights of unions affiliated with it are preserved intact, powers not specifically granted to the Federation under its constitution being reserved to the constituent units. The unions composing the Federation retain and exercise considerable freedom of action. The Federation may suspend or expel a member-

union, but a union can override any Federation action it may deem as intrusive upon its control of matters relating to its own trade.

Samuel Gompers (*q.v.*) is the Federation's president, a post he has occupied with distinction for many years. He heads the executive council, composed of the secretary (Frank Morrison), treasurer (Daniel J. Tobin) and eight vice-presidents. The Federation holds an annual convention, of late years on the second Monday in June, and selects a different city each year for the meetings. Its membership is restricted to wage workers of both sexes, skilled and unskilled. Not every trade union belongs to it, and among non-members are the great railroad brotherhoods, but its sway and the membership of its constituent unions (in 1921, 3,906,528) makes the Federation the dominant power in American labor. Outstanding among its affiliated unions are the Mine Workers of America (the largest), the International Typographical Union of North America, the Brotherhood of Carpenters and Joiners, and the Cigar Makers' International Union. Its membership (1921) embraced 36,247 local unions in 110 national and international unions and 941 local and federal labor unions.

Due to the activities of the Federation in espousing legislation designed to safeguard the interests of labor, Congress enacted many measures of this character, including a national eight-hour day for government employees; exclusion of Chinese and contract laborers; the legal establishment of Labor Day as a holiday; the labor provisions of the Clayton anti-trust act (1914), wherein it was affirmed 'the labor power of a human being is not a commodity or article of commerce'; the protection under this act of labor unions from being classified as trusts or subject to anti-trust laws; the Seaman's Act; the establishment of a Federal Bureau of Labor, which developed (1913) into the existing Department of Labor, whose secretary is a member of the President's Cabinet; the creation of a federal Children's Bureau; and the Workman's Compensation Act. The Federation's success in securing remedial labor legislation is the outcome of an organized movement it developed in recent years to support the nomination and election to Congress of representatives, regardless of party, who pledged their aid to further the enactment of such measures. Its active political policy has created a Labor Group in Congress, the members whereof belong to labor bodies and hold trade union cards. While the general public does not hear

much of this group's activities, its personnel is a growing influence in Congress in all legislation affecting labor.

In its attitude on world questions the Federation stands for internationalism, opposes militarism in all its phases, favors drastic limitation of armaments, and is hostile to the Communist method of government as established in Russia. There have been frequent attempts by Socialistic elements in the organization to control its policy, especially in the early years of the present century. In 1905 many of the radical members forming the Socialist factions seceded and established the Industrial Workers of the World among other independent associations. Today Socialism in its various shades is by no means lacking as a factor influencing the deliberations of the Federation when it meets in Convention. Periodic attacks have been made on the Gompers administration, which have been assailed as too cautious and conservative. Its conventions in the post-war period have indicated that the American Labor movement and what it stands for are in a state of transition. At the 1921 Convention, for example, held at Denver, the progressive elements overrode and routed the executive's opposition to a resolution urging government ownership and democratic operation of the railways.

The Federation's funds are obtained by dues levied on individual members of affiliated unions, and also on the unions themselves as collective bodies.

A striking feature of its scope is reflected in the disbursement of the funds accumulated by its subsidiary bodies. The occurrence of strikes calls for a large expenditure to sustain non-working members, running well into the millions annually. Payments covering death, sick and non-employment benefits are equally large.

The purposes of the American Federation of Labor have been reaffirmed by President Gompers as embracing the practical application of the principle that the economic power of its members is fundamental to all production in that it is derived from labor's creativeness in industry and commerce, and that all other power springs from labor's economic power.

AMERICAN INDIANS. See INDIANS, AMERICAN.

AMERICAN INTERNATIONAL CONFERENCES, gatherings of representatives of all Amer. states to discuss matters of common interest. First, 1824, was convoked by Span. colonies to Panama, with idea of obtaining guarantee by the U.S.A. of their independence from Spain; invitation eagerly accepted

AMERICANISMS

by U.S.A., whose government, though not intending to violate peace with Spain, was anxious to acquire leadership of Amer. continent. Second, 1901, at Mexico, agreed to international arbitration and established International Bureau of Amer. Republics.

AMERICANISMS are words or phrases current in the U.S. but not in Britain, though many are becoming so, partly owing to descriptive matter in connection with Amer. films—(e.g.), *crook* for criminal. They may be divided under two headings—viz., words which were common to both countries before the separation of 1783, but which have since become obsolete in Britain; and words which have come into use in America since that event. Among the former class may be placed: *chore*, trifling job, or errand; *creek*, small stream; *deck*, pack of cards; and *fall*, autumn. In the latter class may be indicated: *elevator*, for lift; *section*, for district; *exposition*, for exhibition; *Dutchman*, for German; *candy*, any kind of sweet-stuff; *biscuit*, hot roll; *cracker*, biscuit; *the cars*, a train; *depot*, railway station; *gums* or *rubbers*, galoshes, overshoes; *store*, shop; *railway*, tramway; *mail*, to post letters; and many others.

AMERICAN SOCIETY OF CIVIL ENGINEERS, an organization of civil engineers founded in 1852. Its home is at 29 West 39th Street, New York City. The Society has about 8,000 members, and maintains an excellent engineering library.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, organization of mechanical engineers, established in 1881. Its home is at 29 West 39th Street, New York City. The Society publishes a Journal, monthly, and maintains a library of over 60,000 books and 10,000 pamphlets.

AMERICAN UNIVERSITY, a post-graduate institution in Washington, D. C., giving courses leading to master's and doctor's degrees, and also carrying on a series of university extension lectures to the public. It was first incorporated in 1891, under the government of the District, but later received a special charter from Congress. Its founder and first chancellor was Bishop John Fletcher Hurst. It has a library of 25,000 volumes and its assets amount to \$3,000,000.

AMERICAN UNIVERSITY UNION OF EUROPE, an organization originating from the period of the World War, when a group of American college and university men in military service formed

AMERICANIZATION

a society 'to meet the needs of American university and college men and their friends, who are in Europe for military or other service in the cause of the Allies, and to serve as a bond between the universities of America and those of other English-speaking nations especially.' In 1919, at a gathering of representatives from forty American universities or colleges, held in New York, it was decided to make the organization permanent, with headquarters in Paris and London.

AMERICANIZATION. At the beginning of the World War the attention of the American people was forcibly called to the great necessity of teaching America's foreign born population the ideals and purposes of democracy. Prior to the war practically nothing had been done by individual States towards educating this element of the population. True, in New York and California there were permanent Commissions of Immigration under whose direction some attempts were made to rectify the neglect.

By 1917 and 1918 some thirty States had organized Americanization Committees generally an adjunct to the State Defense Council, and six had appointed officers as directors for the work. A number of States passed laws providing for the education of immigrants and many made schools compulsory for non-English speaking adults under 45. After the war most of these State Committees were discontinued but some have continued, the work being carried on by the various State bureaus of education. The general outline of the work of Americanization may be defined as follows: A general effort to eradicate illiteracy by improving facilities for immigrant education, by intensive training of aliens, by home classes for women, by industrial classes for men, by giving lessons at shops either on their own time or the time of their employers, by prevention of exploitation of the immigrant by private agencies generally those of his own country, by stimulating the interest of immigrants by pageants, parades, homeland exhibits, bazaars and social functions and by recreational work and community organization. A great deal of progress has been made by private organizations both religious and patriotic. Among the religious groups the foremost have been the societies of Protestant denomination, the National Catholic War Council, the Y.M.C.A., the Y.W.C.A., the Knights of Columbus, the Y.M.H.A. and the W.C.T.U. The patriotic societies most prominent have been the Sons and Daughters of the Revolution, the Colonial Dames of America, the National

Security League, and the American Legion.

AMERICAN LEGION, a national organization of the American Veterans of the World War, defined by its by-laws as being 'non-political, non-partisan and non-sectarian, open to all soldiers who served honorably in the World War between the dates of April 6, 1917 and November 11, 1918. There is no distinction made in rank or as between those who served within the United States and those who served abroad. The organization was founded in Paris, France. The annual Conventions bring delegates from not only every section of the United States but from all her possessions. At the convention of 1922 delegates came also from Argentina, Great Britain, Brazil, Chile, China, Canada, Cuba, Guatemala, India, Japan, New Zealand, Australia, Portuguese, West Africa, Venezuela, Panama, Mexico, Ecuador and Peru. One of the greatest achievements of the Legion has been its successful fight for the improvement in conditions of the administration of affairs of disabled veterans. Through inactivity of Congress and government agencies directly responsible for welfare of disabled volunteers, of the sick and wounded American soldiers of the World War improperly cared for during the years immediately succeeding the signing of the Armistice. Disabled veterans were in dire want. Thousands were without medical care or compensation with which to obtain it. Many had taken refuge in insane asylums, almshouses and even in jails. The Legion's means of influence were exerted through such agencies as the American Legion Weekly, the official organ of the Society, and the American Legion News Service. Those furnish news of the Legion's activities to more than 12,000 newspapers which are read by approximately 50,000,000 people. The National Speaker's Bureau with a volunteer corps of over 4,000 orators throughout the country, together with a newly organized film service has been also a great aid in bringing before the public the demands of the Legion. Among the resolutions adopted by the Legion in the Convention held at New Orleans, La., Oct. 16-20, 1922, was one that the American Legion stand for the carrying out of its obligations to the disabled of war and that should another war arise 'when the American people are aware of the extent of war profiteers, a national determination will have developed that in any future war there shall be a draft not only of service men but of the laboring men and capitalist as well. Had there been such a draft

the fundamental basis of adjusted compensation now temporarily thwarted by executive action would never have arisen.' The officers elected at the Convention of 1922 were Commander Alvin Owsley of Denton, Tex.; Vice-Commanders Edward J. Barrett of Sheboygan, Wis.; Watson B. Miller of Washington, D. C.; E. Eric Cocke of Dawson, Ga.; Robert O. Blood of Concord, N. H., and C. P. Plummer of Casper, Wyo. Chaplain Father William P. O'Connor of Cincinnati, O.; Adjutant Lemuel Bolles of Indianapolis, Ind.; Treasurer Robert H. Tyndall, of Indianapolis, Ind.; Judge Advocate Robert A. Adams of Indianapolis, Ind.; Historian Eben Putnam, Wellesley Farms, Mass.; Assistant Adjutant Russell G. Crevelton, of Indianapolis, Ind. The National Headquarters are located at Indianapolis, Ind.

AMERICUS, the county seat of Sumner County, Ga., about 80 miles southwest of Macon, on the Central R. R. of Georgia, the center of an extensive cotton raising region. Its manufacturing includes cotton mills, fertilizer plants, syrup refineries, etc. Pop. 1920, 9,010.

AMERIND (contracted form of American Indian), term to describe primitive races of America.

AMERONGEN, vil., Utrecht, Holland (52° N., 28° 5' E.), 20 m. S.E. of Utrecht; contains castle (Count Bentinck's) in which ex-Kaiser William sought refuge after abdication and where he remained until new home was built for him in 1922.

AMERY, RT. HON. LEOPOLD CHARLES MAURICE STENNETT (1873), an English journalist and politician, b. in Gorakhpore, India, Nov. 22, 1873. After graduating from Oxford University, in 1895, he began newspaper work and later joined the editorial staff of the London 'Times,' which paper he represented as chief correspondent in South Africa during the Boer War. On his return he edited 'The Times History of the War in South Africa' (7 vols., 1900-09). In 1903 he was one of the prominent agitators under Chamberlain's leadership for tariff reforms, in the direction of a protectionist policy. During the World War he did special service in France and the Balkans, and in 1921 was appointed Under Secretary to the Admiralty.

AMES, ADELBERT (1835), American soldier, b. in Rockland, Me. Graduating from West Point Military Academy, in 1861, he was immediately sent to the front and fought during the entire period of the Civil War, from which he emerged

with the rank of Major-general. During the reconstruction period in the South he was prominent as one of the so-called 'carpet-baggers,' being elected governor of Mississippi in 1873 by the Negro vote. So antagonistic was the attitude of the white population against him, however, that even with the backing of Federal troops, he soon found his position untenable and a year later resigned, on condition that impeachment proceedings against him be quashed. During the Spanish-American War he served as a brigadier-general of volunteers.

AMES, FISHER (1758-1808), Amer. statesman; took prominent part in political life during Washington's administration.

AMES, OAKES (1874), an American botanist, b. in North Easton, Mass., Sept. 26, 1874. After graduating from Harvard University, in 1898, he was first assistant, then instructor, in the same institution, becoming assistant director of the Botanical Garden there in 1910, and director a year later. Since 1915 he has been assistant professor of economic botany at Harvard. He is well known as an authority on orchids and has contributed many articles to the literature on the subject.

AMES, WINTHROP (1871), an American theatrical producer and manager, b. in North Easton, Mass.

He graduated from Harvard University, in 1895, then, after a year's post-graduate work, went into the general publishing business, later becoming interested in the publication of books on art and architecture. In 1904 he took up the management of the Castle Square Theatre in Boston. Here he acquired such a reputation for his high standards that when, in 1908, the New Theatre was organized in New York City with the financial backing of wealthy people who sought to raise the dramatic tastes of the public, he was invited to take over the management. After the financial failure of the enterprise, in 1911, he took over the management of the Booth Theatre, where he remained until 1922, in the fall of which year he produced '*Will Shakespeare*,' in the National Theatre.

AMESBURY, a town in Essex County, 25 miles north of Salem, on the Merrimac River and on the Boston & Maine R. R. It is of considerable importance as a manufacturing center, about 60 industrial plants being located there, employing 1,600 workers. Among its chief products are automobiles, motor boats, hardware, etc. It is also noted as having been the home of John Green-

leaf Whittier, who died there in 1892. Pop. 1920, 10,036.

AMETHYST, clear violet or purple variety of quartz occurring in cavities in granitic rocks and mineral veins or in agate geodes; used as a gem-stone, and formerly as an amulet to protect its wearer from intoxicating drink.

AMHERST COLLEGE, at Amherst, Hampshire County, Mass., was founded in 1820, beginning with a faculty of two professors and 47 students. It was granted a charter in 1825. Ranking as an institution of the liberal arts, its studies are largely elective, but among the requirements for graduation are: one each of English, mathematics and history or philosophy; two years of Greek or Latin; two years of science from the group of biology, chemistry, or physics; and a reading knowledge of German or of French, Italian or Spanish. In 1921-22 the students numbered 503 and the faculty 46. Pop. of town 5,550.

AMHERST (45° 52' N., 64° 5' W.); town, Nova Scotia. Pop. 9,975.

AMHERST, BARON, JEFFREY AMHERST (1717-97), Brit. general; performed brilliant service in conquest of Canada; gov. of Virginia (1763); gov. of Guernsey (1770); cr. peer (1776).

AMICIS, EDMONDO DE (1846-1908), Ital. writer; commenced life as soldier and fought at Custoza, 1866; published book of military sketches, 1867; retired from army, 1870, and wrote books on travel, some poetry, and several novels.

AMICUS CURIE, legal term referring to a person supplying special information during hearing of a case.

AMIEL, HENRI FREDERIC (1821-81), professor of Aesthetics, later Ethics, at Geneva, whose published selections from his journal, 1882-84, teem with suggestive thoughts on the vital issues of the day; translated by Mrs. Humphry Ward.

AMIENS, tn., on Somme, France (49° 53' N., 2° 18' E.), formerly cap. of Picardy, see of a bishop; manufactures linen, woollens, silks, velvets, etc. Cathedral (1220-88), finest Gothic building in Europe (see Ruskin's *Bible of Amiens*). Memorable for *Mise of Amiens* (1264), in which Louis IX. upheld Henry III.; and *Treaty of Amiens* (1802) concluding peace between Britain and France. In World War occupied by Germans (Sept. 4, 1914); reoccupied by Allies; thereafter held, though in March 1918 enemy came within 8 m. Cathedral escaped serious damage, but much destruction in town. Pop. 1921,

92,780. See General Article, WORLD WAR.

AMMETER (PROPERLY AMPERE-METER), a type of galvanometer, an instrument for the measurement of the strength of electric currents, the pointer being held at zero by a spring, or weight, or a permanent magnet. There are three types of this instrument; thermal, electro-magnetic, and electrodynamic, the name of each indicating its special purpose.

AMMON, AMON, principal god of ancient Egyptians, generally represented as a man with ram's horns, or with ram's head. There was a temple of A. in Thebes and one in the Libyan Desert, to which Alexander the Great made a pilgrimage. The worship of A. spread to Greece and Rome.

AMMONIA (NH_3), colorless gas which does not support combustion, with characteristic pungent smell, occurring naturally in minute quantities in the atmosphere, in water, and in decomposition of nitrogenous organic matter; liquified a. boils -33.7°C . and solidifies -75°C . It is readily soluble in water, forming ammonia water (NH_4OH), which may be regarded as containing the ionized radicals, ammonium (NH_4), and hydroxyl (OH), and, owing to the latter, has a strongly alkaline reaction. The group ammonium has not been isolated, but behaves chemically very much in the same way as the alkali metals. The most important salts largely obtained in the manufacture of coal gas are ammonium sulphate, used for the preparation of the numerous other salts and as a fertilizer, ammonium carbonate (sal volatile), and ammonium chloride (sal ammoniac, *q.v.*) The preparation of ammonia from the nitrogen of the air is an important, but hitherto unsolved, economical problem. Ammonia is used in pharmacy, in dyeing, in the soda-manufacturing process, and in ice-making.

AMMONIACUM, gum exuded from the stem of *Dorema ammoniacum*, a herb of the order *Umbelliferae* of Persia and the Punjab; collected in brownish tears of a faint odor and bitter taste; used medicinally as an expectorant in cases of chronic bronchial affections.

AMMONITES, Semitic race living E. of the Jordan, who were at continual feud with the Jews until finally subdued by Judas Maccabæus; principal city was Rabbath-Ammon.

AMMUNITION, a term including projectiles for firearms, the explosives that propel them, fuses, fulminating caps and other igniting devices, and the

cartridges in which the ammunition is made up for use. Cartridges for small arms were originally, as the word implies, small paper cases to hold the charge of gun powder. Paper or cardboard is now only used in making up ammunition for shot-guns. The military cartridge has a case of thin metal (brass or copper), solid drawn, and with a rim on the base (Lee-Metford, etc.), or a groove close to it (Mauser, etc.), to give a grip to the extracting device which ejects the discharged cartridge case after firing. The percussion cap, containing fulminating powder, is fixed in the center of the base. The cartridge is loaded with a smokeless explosive (cordite in the Brit. army), and after being loaded, the bullet (lead, some times coated with nickel or copper, and round-nosed or pointed) is fixed in its fore end with a watertight joint. Machine guns are always constructed to carry the regulation rifle cartridge of the army with which they are used. Steel-pointed bullets have been employed for piercing defensive shields; bullets carrying an easily ignited incendiary head, for the attack on war balloons, zeppelins, etc.; and bullets that leave a trail of smoke as they fly ('tracer' bullets), for indicating the direction and range of machine-gun fire. Explosive bullets for small arms are forbidden by international agreement, the minimum legal weight for explosive projectiles being 500 grammes (about one pound). But rifle grenades of this weight are fired with the service rifle by attaching the grenade to a stick which is slipped into the rifle barrel, and fired off by a cartridge placed in the breech. Bombs thrown by hand are also in use, the bomb being made safe for carrying by a pin to be withdrawn before hurling it. Heavier bombs are discharged from small 'trench mortars.'

Artillery ammunition may be divided into shrapnel and high-explosive (H.E.) shells. A shrapnel shell is loaded with bullets, and has a fuse and a small bursting charge, and the fuse is set so as to burst in the air above and in front of the target. The action of the burst is simply to open the case and set the bullets free. These continue their flight forwards and downwards with their already acquired direction and velocity, falling over a large oval space, the longest diameter of which is in prolongation of the line of fire. H.E. shells are practically flying mines, steel cases loaded with lyddite or some other high explosive. Their action depends on the shattering effect of the explosion, and they are used for wrecking entrenchments, buildings, etc. For quick-firing artillery of moderate calibre 'fixed

ammunition' is used; that is, the shell is fixed in a copper or brass case containing the driving charge, and having a percussion cap in its base. It is like a gigantic rifle cartridge.

Ammunition for naval guns includes armor-piercing projectiles with a hardened steel point, often fitted with a soft iron cap to prevent the point glancing from the plate. The percussion fuse of naval shells is often fitted with a delaying action to secure a burst inside the enemy's ship after piercing her side.

Gas shells contain a charge of compressed gas, which is diffused as a blinding and asphyxiating cloud on the shell bursting. Shells for anti-aircraft guns include shrapnel, intended to riddle the hostile plane with a bullet shower, and H.E. shells, intended to wreck it with the explosion and the air disturbance thus caused. The projectiles dropped by aircraft include incendiary bombs, to start fires, and H.E. shells, these ranging in weight from a few pounds to nearly a ton. The fuse is set for action by a small revolving helical vane (like a miniature screw propeller), which is set in motion by the action of the air as the bomb drops.

Small-arm ammunition is carried in pouches and bandoliers by the men, with a first reserve in the regimental small-arms carts. These are refilled when required from the ammunition columns of the artillery, which convey reserve ammunition for both guns and small arms. A further reserve is kept in the ammunition parks of the line of communications.

AMCEBA, genus of rhizopod Protozoa (q.v.), occurring widely in stagnant water, the best-known species being *A. proteus*. It is one of the simplest animals, diameter about $\frac{1}{100}$ in., consisting of a nucleated mass of protoplasm densest in its outer part (ectosarc), and moves, changing its shape, by protruding parts of itself called pseudopodia, which also serve for engulfing food (minute organisms, etc.). Respiration and excretion are carried on by contractile vacuoles. Divided into two sub-orders, *Proteomyza* and *Lobosa*.

AMEN, a Hebrew liturgical word of affirmation. It is used as a response at the conclusion of a doxology, prayer, etc. Justin Martyr is the first of the fathers who speaks of this use of the response. The word varies in meaning according to its position. It has usually a final or detached position, and signifies 'So let it be.' The use in the gospels of the word amen (or more frequently the double a. trans. in the a.v. 'verily, verily') is peculiar. The 'flat' force of the word is there lost, and it serves merely

to lay stress on some important statement about to be made.

AMOR (classical myth.), another name for the Rom. Cupid, god of love; equivalent to the Gk. Eros.

AMORITES, Israelitish name applied to early natives of Palestine.

AMORPHOUS, having no definite form; (min.), having no crystalline structure.

AMORTISATION, originally the disposal of lands in mortmain; latterly the cancelling of a debt within a specified time.

AMOS (VIII. cent. B.C.), Hebrew 'minor prophet'; shepherd by occupation; believed to have been the first prophet to commit his prophecies to writing.

AMOY (24° 34' N., 118° 10' E.); town and island, China; fortified; fine harbor; open to foreigners; trading center; exports tea, sugar, etc. Pop. (town), c. 400,000.

AMPELOPSIS, VIRGINIA CREEPER, ornamental climbing plant related to the grape-vine, with tendrils ending in adhesive disks.

AMPERE, ANDRE MARIE (1775-1836), Fr. physicist; b. Lyons; prof. of Physics at Bourg, Lyons, the Polytechnic School at Paris, and the College de France; discovered the relations between electricity and magnetism and developed the science of electro-dynamics (electromagnetism). The unit of electrical current is called after him, the **Ampere**.

AMPERE, ELECTRIC CURRENT UNIT, an international unit of the strength of an electric current. An ampere is sufficient electric current to deposit 1.118 milligrammes of silver, per second, in a standard type of electro-depositing bath.

AMPEREMETER. See **AMMETER**.

AMPHIBIA (zool.), term introduced by Linnaeus for a class of animals including snakes, turtles, frogs, salamanders, and lizards, modified by Cuvier and Brongniart, who recognized the difference between frogs and salamanders and the Reptilia. Huxley united amphibians (Batrachia) and fishes in the division Ichthyopsida, and reptiles and birds as Sawropsida. The term **a.** is now usually replaced by Batrachia.

AMPHIBOLE, group of rock-forming minerals allied to the pyroxene group, but differing from the latter in cleavage and optical characters. The amphiboles are calcium, magnesium, or aluminium

silicates with iron or other metals; and they include horn-blende, tremolite, actinolite, glaucophane, crocidolite, and other minerals.

AMPHIBOLITE, term for a metamorphic rock consisting essentially of amphibole (hornblende) when schistose called hornblende schist, containing divers accessory minerals, (e.g.) feldspars, iron oxide, biotite, etc. Owing to its different modes of origin and structural character representing different stages of metamorphism, a. cannot be strictly defined.

AMPHICTYONY, celebrated federal council of ancient Greece, associated with a shrine, the temporal affairs of which were in its charge. The members were chosen from the principal neighboring tribes, and there were such councils at Delos, Argos, and, most famous of all, at Delphi.

AMPHIOXUS, LANCELET, widely distributed marine animal between 1½ and 3 in. in length, somewhat fish-like in appearance, and inhabiting shallow water (c. 2 fathoms) with a sandy bottom. Its structure is of extreme interest, as it exhibits numerous affinities with vertebrates, of whom it may be regarded as a primitive, though degenerate offshoot. About sixteen species are included in the subphylum Cephalochorda (Acrania, Pharyngobranchii) of the phylum Chordata. A. is faintly flesh-colored and translucent, pointed at both ends with a dorsal median fin and two metapleural folds ventrally, and has 62 V-shaped muscular segments (myotomes). The rigidity of the body is maintained by a dorsal rod notochord composed of turgid cells surrounded by a sheath running from tip to tip. A dorsal tubular nerve-cord without a definite brain lies above it. The mouth is overhung by a hood bearing a fringe of 'cirri' and a 'velum' for wafting in the food. The walls of the gullet are perforated by numerous gill slits, and the water is ejected through the 'atriopore' in the 36th myotome, while the food is wafted along ciliated grooves through the straight intestine to the anus situated near the atriopore. The only known sense-organs are sensory cells in the epidermis. There is a rhythmically contractile branchial artery with colorless blood, instead of a heart. Excretion is carried on by a complex arrangement of about 90 pairs of 'nephridia' situated in the wall of the pharynx. The sexes are separate and the ductless gonads (ovaries and testes) are arranged in 26 pairs of sacs along the ventral side of the body. The development is of great theoretical interest.

AMPHITHEATRE (all round), spacious building, generally oval in form, used by the Romans for gladiatorial combats and other spectacles, the interior being encircled by tiers of seats; open space in center was called the *arena* (name derived from the sand with which it was strewn). The most famous a. is the Colosseum at Rome, begun by Vespasian, and finished by Titus 80 A.D. It covers five acres of ground; held 87,000 spectators; and is the largest structure of its kind, and the best preserved. Other fine Roman a's are to be seen at Verona, Nîmes, Arles, etc.

AMPHITRITE (classical myth.), dau. of Nereus (Oceanus) and wife of Poseidon; name also used for sea.

AMPHITRYON, king of Tiryns, husband of Alcmena, who became the mother of Iphicles and Hercules.

AMPHORA, large two-handed vessel, usually of earthenware, used by Greeks and Romans for holding wine, oil, etc.

AMPLITUDE (physics), the extent of a vibratory movement (e.g. wave or pendulum) measured from the mean position to an extreme; (math's), angle determining the value of elliptic functions; (astron.), the complement of azimuth; also the arc of the horizon between the magnetic west of east point and a heavenly body.

AMPTHILL, 1ST BARON, ODO WILLIAM LEOPOLD RUSSELL (1829-84), diplomatist; attaché to embassies of Paris, Vienna, Constantinople; Sec. of Legation at Rome for twelve years; Assistant Under-Sec. of State for Foreign Affairs (1870); late ambassador at Berlin; cr. Baron A. (1881).

AMPUTATION, the cutting off of a limb or projecting part of the body, sometimes necessary in order to prevent the mortification or disease of that part poisoning or exhausting the whole body. There are three inventions which have made a. safer and more readily resorted to than in previous centuries. These are the tourniquet, to stop the flow of blood in the arteries; an æsthetic, to procure painlessness; and antiseptics, to prevent infection of the wound. The objects of a. are primarily to remove a dangerously diseased or injured part, and then to leave a stump which may be as useful and as free from pain as possible to the patient.

AMRITSAR (31° 43' N., 74° 53' E.); town, Punjab, India; religious center of Sikhs; has Golden Temple; ivory work; silks, shawls, etc. Pop. 160,400. District produces cereals. Pop. 1,200,000

AMSDORF, NICOLAUS VON (1483-1565), Ger. Prot. reformer; friend of Luther; did much to further the Reformation; was associated with foundation of Jena Univ.

AMSTERDAM, seapt.; commercial cap. of Holland at mouth of Amstel (52° 22' N., 4° 54' E.), built on piles, intersected by canals, connected with North Sea by two canals (1876 and 1892). Busy and extensive harbor; royal palace, town hall, new church (tomb of de Ruyter and crowning place of sovereigns), old church, new bourse, central ry. st., university, Royal Academy of Science, Ryks Museum, zoological and botanical gardens. Chief industries: diamond-cutting, sugar-refining, tobacco, cigars, shipbuilding, engineering, etc. A fishing village in 13th cent.; present commercial supremacy due to Dutch E. India Co. (1602) and Bank of Amsterdam (1609-1796). Exports: Dutch produce, butter, cheese, oil, etc. Pop. 624,162.

AMSTERDAM, a city in Montgomery co., N.Y., 33 miles northwest of Albany, on the New York State Barge Canal, the New York Central and West Shore R. R. It is a terminal shipping point of the canal. Aside from that it is important as an industrial center, having over a hundred manufactories, employing 12,000 workers. Among its chief products are carpets, rugs, brooms, knit goods, silk goods, pearl buttons, hosiery, gloves, needles, looms and bobbins, several large foundries and machine shops also being located there. Pop. 1920, 33,524.

AMUNDSEN, ROALD (1870), Norwegian explorer; member of the Belgian expedition to Antarctic (1897-9); in *Gjoa* made discoveries regarding N. magnetic pole (1903-6); proposed to drift with ice in *Fram* to neighborhood of N. Pole, but postponed voyage; first to reach S. Pole (Dec. 14, 1911); sailed for N. Pole in June, 1918, via Barents Sea; abandoned enterprise (1919); but proposes another similar attempt (1920). In 1923 he conducted further explorations in the Arctic Region. See for his greatest exploit his *South Pole* (2 vols. 1912).

AMUR, AMOOR (51° 30' N., 128° 45' E.), the 'Great River' (about 3000 miles), Siberia and China; enters Sea of Okhotsk; fertile basin; partly navigable.

AMUR (52° 30' N., 129° 15' E.), province, E. Siberia; crossed by Great and Little Khingan and Stanovoi ranges; produces gold; town, Blagovieschensk. Pop. c. 200,000.

AMURATH (1) Amurath I., Sultan of Turkey 1360-89, began Turkish conquests to Europe. (2) Amurath II., sultan 1422-51; defeated Hungarians at Varna and Kossovo. (3) Amurath III., sultan 1574-95. (4) Amurath IV., sultan 1623-40; notorious for his extreme cruelty. (5) Amurath V., sultan May-Aug. 1876.

AMYGDALIN (C₁₀H₁₇O₁₁N), white crystalline glucoside isolated from bitter almonds.

AMYL ALCOHOLS, eight isomeric liquid compounds of the formula C₅H₁₁OH. *Iso amyl alcohol* is a constituent of fusel oil.

AMYL NITRITE (C₅H₁₁NO₂), yellow, oily liquid with characteristic odor, B.P. c. 96°. The inhalation of the vapor causes flushing of the face and palpitation of the heart in consequence of vascular dilatation. Used medicinally to relieve pain in cases of angina pectoris, and to lower the blood pressure in certain other affections.

AMYLOID, a colloidal modification of cellulose, produced by dissolving it in sulphuric acid mixed with half its volume of water, and precipitating with water. So called because it gives blue color with iodine.

AMYNTAS II. (c. 393 B.C.), king of Macedonia; patron of the arts.

AMYOT, JACQUES (1513-93), Fr. author; became prof. of Gk. and Latin at Bourges; Great Almoner of Charles IX. and bp. of Auxerre; chiefly remembered for fine version of Plutarch's *Lives*, which was rendered into Eng. by Sir Thomas North, and is supposed to have been used by Shakespeare.

AMYRAUT, MOSES (1596-1664), Fr. Prot. theologian; prof. of Theology at Saumur (1633); shared in the chief controversies on Arminianism and predestination; pub. many controversial and religious books.

ANABAPTISTS, name loosely used of several sects which arose in Europe at and after the Reformation. They first appeared at Wittenberg. 1521. Their tenets were partly religious (the rejection of current doctrine Catholic or Reformed) and partly social. They became all-powerful in Munster, 1532-35, and were then cruelly put down. The term 'Anabaptist' was applied later to various reformers, who often did not follow the teaching of those of Munster. Like some mediæval heretics they sought a primitive ideal of apostolic simplicity, and perhaps they can best be described as Christian Socialists.

ANABASIS (401 B.C.), name of Xenophon's narrative of the expedition of Cyrus the younger against Artaxerxes.

ANABOLISM, constructive metabolism, process by which foodstuffs are built up into the living matter of the cell.

ANACHARSIS (600 B.C.), Scythian philosopher; friend of Solon; reputed to have invented the two-fluked anchor.

ANACHRONISM, error in computing time; referring an object or event to a particular period which really belongs to another.

ANACONDA (*Eunectes murinus*), S. Amer. snake, of the boa family, said to attain a length of over 30 ft.; inhabits swampy forests, and hides in water to catch mammals or birds.

ANACONDA, county seat of Deer Lodge County, Mont., 25 miles northwest of Butte, on the Northern Pacific, the Great Northern & Butte, and the Anaconda & Pacific railroads. Its existence is entirely dependent on the great Anaconda copper mines, in the vicinity, though several large railroad machine shops are also located there. The copper smelting works operating there are the largest in the world, from 5,000 to 10,000 tons being treated daily during periods of normal operation. It has a library of 6,000 volumes, two opera houses, one newspaper and one weekly paper. Pop. 1920, 11,668.

ANACORTES, city in and county seat of Skagit co., Wash., 90 miles north of Seattle, important as a Puget Sound shipping port, on the Great Northern R. R. It is the shipping point of considerable lumber cut in the region and fish canned and cured in the vicinity. It also has a number of ship yards and some industries, including glass factories. Pop. 1920, 5,284.

ANACREON (b. 560 B.C.), Gk. lyric poet of Teos; friend of Simonides; patronized by Hipparchus; wrote hymns to Artemis and Dionysus, but is chiefly famous for his amatory and bacchanalian lyrics. Anacreontics, love lyrics, or drinking songs, supposed to follow the style of A.

ANÆMIA, a general term applied to blood diseases in which there is either a diminution in the normal number of the corpuscles of the blood (*q.v.*) or in the amount of hæmoglobin in each corpuscle. A's are classed as primary a's or secondary a's, the first including chlorosis and pernicious a., of which causes have not yet been discovered, and the secondary a's due to excessive

bleeding, malignant growths, intestinal parasites, etc., which cause derangement of the normal supply or destruction of red blood corpuscles.

ANÆSTHESIA, a state of insensibility to pain, either general or local, produced in med. by substances termed *anaesthetics*. Anaesthetics of one kind or another seem to have been employed from very early times. In 1848 Wells, an Amer. dentist, introduced nitrous oxide as an anaesthetic in dentistry, and two years later Morton, another Amer. dentist, commenced the use of ether as an anaesthetic. The modern development of anaesthetics dates from 1847 when Sir James Young Simpson of Edinburgh first employed ether and later in the same year chloroform in the practice of midwifery.

At the present day a variety of anaesthetics are in use. *Nitrous oxide* or nitrous oxide mixed with oxygen has a short induction period and is usually unaccompanied by nausea; and it is employed most usually in dentistry. *Chloroform* and *Ether* are commonly used in surgical operations, either by themselves or mixed, and it is a matter of discussion which is better. *Ether*, which is used either by the 'close' or 'open' method, is more apt to cause nausea and vomiting on recovery, but it is generally a safer anaesthetic with a less experienced anaesthetist; in operations about the face where a closely fitting mask is impracticable, in children and elderly people, and also in midwifery, chloroform is the better.

Ethyl chloride is a useful anaesthetic in minor operations, and to induce anaesthesia before chloroform, and is becoming more and more used. In operations covering a limited and superficial area local a. may be applied, by spraying the part to be operated upon, with ether or ethyl chloride, or by injecting a local anaesthetic into the subcutaneous tissues, into a nerve trunk or into the sub-arachnoid space of the spine. *Cocain* and its preparations, *eucain*, *tropacocain*, *novocain*, *stovain*, are commonly thus employed.

ANAGNI, episcopal city of Italy, on a hill 36 m. S.E. of Rome. The bishopric dates from the fifth century, and the cathedral of Santa Maria from the eleventh. Pop. 15,000.

ANAGRAM, word or sentence formed by transposing the letters to form other words; thus, 'file' may be transposed into 'life'; a.-making is of great antiquity.

ANAH, 'ANA', (34° 25' N., 42° E.), town, Mesopotamia; on Euphrates; produces fruit; manufactures cloth; ruined castle on neighboring island;

early history unknown; taken by Emperor Julian 363; ruled by amir in XVII. cent.; often attacked by desert Arabs.

ANAKIM (Sons of Anak); race of giants descended from Arba, who dwelt in S. Canaan; chief city, Hebron (*Numbers 13* and *Joshua 11*).

ANALYSIS, resolving a datum into its elements or (in logic) finding the premises by which a conclusion can be established. *Mathematical analysis* denotes the algebraical as contrasted with the geometrical treatment of the properties of figures. *Grammatical analysis*, breaking up a sentence into its several parts—subject, predicate, etc. *Chemical analysis*, process of separating a compound body into its constituents: may be *qualitative* or *quantitative*. Various physical instruments—(e.g.), microscope, spectroscope, polarimeter, and electrical methods—now also employed.

ANAM, See **ANNAM**.

ANANIAS, husband of Sapphira; both punished by Peter with sudden death because of their lying and hypocrisy (*Acts* v. 1-10).

ANARCHISM (Gr., 'without rule'), name given to that form of political theory which objects to all government. 'Anarchist' generally suggests a certain violent type of revolutionary, one of whose methods of bringing about the millennium is to put to a violent death all kings and rulers, and it is this type which, working by means of secret societies, constitutes a menace to society. It is thus theoretically diametrically opposed to Socialism, which would increase rather than diminish the scope of government; but extreme Socialists and anarchists may (and do) for the time join hands to overthrow the existing system which they both consider evil. Anarchism, however, may be quite different. Tolstoy was an anarchist. In the strict sense. All government, according to him, was evil, though he advocated non-resistance to evil. A modern state as such was directly tyrannical. In objecting to all organized government he followed some earlier thinkers, though it would seem impossible to reconstruct society (if one would then speak of society at all) on such a basis. Violent anarchism can almost be called a disease in the body politic, for anarchists seem to be bred in countries which have for centuries suffered from misgovernment. In recent years they have murdered Pres. Carnot, the Empress of Austria, Pres. McKinley, and King Humbert of Italy, besides attempting to kill others. A similar kind

of revolutionary in Russia was called 'Nihilist.'

ANASTASIUS—(1) Pope, 398-402; chiefly remembered by his opposition to the writings of Origen, whose advocate, Rufinus, he excommunicated. (2) A. I., surnamed Dicorus, Byzantine emperor 491-518, succeeding Zeno, whose wife, Ariadne, he married. Ruled with great energy and justice. His reign was disturbed by the Isaurian (492-6) and the Persian wars (503-5), and by invasions of Slavs, Huns, and Bulgarians. (3) A. II., surnamed Artemius, Byzantine emperor 713-16. Deposed by a mutiny of the navy, which proclaimed Theodosius III. in his place. A. became a monk in Thessalonica, but later headed a revolt against Leo, the successor of Theodosius, and was executed.

ANATOLIA, the general name given to the territory comprised of Asia Minor (q.v.).

ANATOMY, term (Gr.) originally meaning dissection or cutting up, now applied to the study of the structure of animals (*zootomy*) and plants (*phytotomy*). *General Anatomy* treats of the structure of the tissues of which the different parts of the body and the organs are composed. *Histology* deals with the study of their microscopical appearances. *Special or Descriptive Anatomy* treats of the different organs and parts in regard to form, special structure, and relation to each other. *Osteology* deals with the bones, *Arthrology* with the ligaments and joints, *Myology* with the muscles, *Neurology* with the brain, spinal cord, and nerves, *Angiology* with the heart, blood-vessels, and lymphatics, *Splanchnology* with the special organs of the body. *Surgical or Topographical Anatomy* refers to the relations of the different regions of the body with special regard to surgical and medical diagnosis and surgical operations, and *Surface and Artistic Anatomy* to the marks on the surface of the body corresponding to the deeper structures, the effects on the superficial appearance of internal structures, and the proportions of the different parts. *Comparative Anatomy* is the study of the relations of the structure of the different animals to one another and to man.

ANAXAGORAS (c. 500-428 B.C.), Gk. philosopher, b. at Clazomenæ Ionia. About 464 he went to Athens and taught there for thirty years, among his pupils being Pericles, Euripides, and perhaps Socrates. He exerted great influence, both on account of his mathematical and astronomical wisdom and the ascetic dignity and strength of his character.

His attempts to explain physical phenomena by natural means laid him open to the charge of impiety. He was acquitted after being defended by Pericles, but left Athens for Lampacus on the Hellespont, where he *d.* He laid the foundations of the atomic theory, and believed in an infinite intelligence in the universe.

The chief treatise of A. was on nature, sev. fragments of which have been preserved by Simplicius and others. Vitruvius attributes to him a work on perspective.

The leading notion of A. was that all things were in a state of confusion till Nous (intelligence) placed them in order. Many strange opinions on physical philosophy are attributed to him. He said that the sun was a mass of hot iron larger than the Peloponnesus; his opinion that the moon derived her light from the sun is probably not his own. His fragments were collected by W. Schorn, Bonn, 1829.

✱ **ANAXIMANDER** (611-547 B. C.), scientific philosopher of Miletus; pioneer of exact science; said to have introduced sundial into Greece.

✱ **ANAXIMENES OF MILETUS** (d c. 500 B.C.), Gk. philosopher of Ionic school; held that air is the origin of all life and matter.

✱ **ANAZARBUS** (37° 18' N., 36° 5' E.), ancient town, Cilicia; destroyed by crusaders.

ANCESTOR-WORSHIP, held by Herbert Spencer to have been the foundation of all religions; springs from the conception of a soul animating a body during life, and, after death, continuing in the unseen life begun here. Thus with the Romans the word *manes* stood for the friendly spirits of the household, and it was the duty of male descendants to offer food and sacrifices to them. On festival occasions small images, called *Lares*, crowned with garlands, were placed around the hearthstone, of which they were considered to be the unseen, but not less powerful, guardians. Similarly the Amer. Indians, and other primitive races, look to the spirits of their dead ancestors to further their success in battle. It is the dominant religion in China at the present day, and the 'spirit-tablets' found in the living-rooms of Chin. houses, inscribed with the names of dead ancestors, are supposed to be tenanted by their spirits.

ANCHISES (classical myth.), Trojan hero; s. of Capys and Themis. Aphrodite became enamoured of his beauty, and bore him Æneas. Æneas carried him on his shoulders, fleeing from burning Troy.

ANCHOR, appliance attached to a vessel by a cable and fixed to the bottom of the sea, river, or lake, thus holding the vessel in a particular place. Originally, and now in various localities, heavy weights such as stones were used. But since the use of iron became universal the popular form of a, with two branching arms ending in flukes for hooking fast, has persisted. They usually have a transverse stock to prevent the a. from becoming useless through dragging without fouling. Heavy patent stockless a's of steel, in which the arms are pivoted and the flukes are side by side, are now much used on large vessels, (e.g.) men-of-war. Other kinds are the grapnel for small boats, and the screw a.

ANCHOVY. See HERRING.

ANCHOVY PEAR, a tree indigenous to the marshy dists. of Jamaica and the W. Indian Is. It attains a height of 50 ft. and bears leaves from 2 to 3 ft. long. The fruit resembles the E. Indian mango.

ANCIEN REGIME (ancient rule), Fr. government before Revolution, 1789.

ANCIENT HISTORY, period commencing with earliest knowledge of existence of man, and ending, by hist. convention, with temporary fall of civilization when Western Rom. empire came to an end, 476 A.D. The preceding period is *Prehistoric*, a term which has altered in meaning of late years; the ages before beginning of definite records used to be considered the field of archaeology as opposed to pure history; now, however, that history has been established as a science, archaeological evidence is essential history. Ethnologists divide history into eolithic, palæolithic, neolithic, bronze, and iron ages, that is, into Stone and Metal Ages, discovery of metals forming great epoch in civilization. Australian aborigines, Amer. Indians, etc., are still in Stone Ages, but central stream of human events has left them behind as period of history. The date of appearance of Eolithic ('earliest stonework') man has been questioned; he possibly existed in geological Tertiary Period, but the 'eolithic' remains discovered in Kent and at Baalbek may belong to Quaternary Period, and it is still doubtful whether those supposed implements are not merely natural products.

Palæolithic Period falls in Second Ice Age, when mammoth, rhinoceros, reindeer, etc., roamed in northern and central Europe, human race definitely appeared and cave drawings, evidence of rudimentary art, were made. The Neolithic Age, marked by similar climate, fauna, and flora to that of later

ANCONA

times, closed, 4000-2000 B.C. (the first bronze objects known date from c. 3000).

In the ordinary curriculum A.H. comprises the history of Egypt, Assyria, Babylonia, Persia, China, Greece, Macedonia, and Rome.

ANCONA (43° 37' N., 13° 30' E.), Adriatic seaport, capital of province of Ancona, Italy; Rom. Arch. of Triumph and mole; Romanesque cathedral, fine Gothic churches; good harbor; exports calcium carbide, silk, eggs, iron, soap, and sugar works. Pop. 68,430; province, 325,000.

ANCRE, small riv., trib. Somme, dep. Somme, France, rises in chalk down 4 m. S. of Bapaume, and flows past Albert to the Somme at Corbie, 10 m. E. of Amiens. Scene of heavy fighting at opening of first battle of the Somme (July 1, 1916); after capture of Beaumont-Hamel (Nov. 18), Brit. line advanced on both banks, compelling the Germans to retreat to Hindenburg Line (Jan. 1917); after great Ger. offensive on March 21, 1918, British finally stood on line of Ancre in defence of Amiens, and advanced from it on Aug. 21, 1918.

ANDALUSIA (37° 30' N., 4° 30' W.), old province, Spain; watered by Guadalquivir; mountainous in N. and S.; highest peaks, Mulacen and Peleta; sherry, silk, fruit, copper, lead; chief towns, Seville, Malaga, Granada, Cadiz; successively invaded by Carthaginians, Romans, Vandals, Goths, Moors. Pop. 3,600.

ANDALUSITE (Al₂SiO₅), hard, transparent, or greyish mineral crystallizing in square prisms and occurring in altered clay or crystalline schists. A variation, *chiastolite* or cross-stone, is used as an amulet, a transverse section showing a black cross on a greyish ground.

ANDAMAN ISLANDS (12° 26' N., 92° 22' E.), two groups, Great A. and little A., Bay of Bengal; number some 200; largest: North, Middle, and South A.; area, 2508 sq. miles. Surface is hilly; highest peak, Saddle Peak, North A. (2400 ft.); no rivers; many bays have beautiful coral beds; coasts indented; principal harbors, Port Blair, Elphinstone Harbor, Stewart Sound, Port Cornwallis, Port Anson, Port Campbell. Climate is tropical; products, tea, coffee, timber, sugar, nuts, aloes, etc.; fauna include turtles, bats, wild-cats, pigs. Natives (c. 2000) are Negroid savages of small stature. Bengal government established penal colony on islands, 1789-96. Ind. government has had convict settlement at Port Blair, since 1858; convict pop. 1911, 12,000.

ANDANTE, musical term for a moder-

ANDERSON, CARLOTTA

ately slow movement, somewhat quicker than *larghetto*, somewhat slower than *andantino*.

ANDERSEN, HANS CHRISTIAN (1805-75), Dan. poet and writer of fairy tales; b. Odense; s. of a poor shoemaker. At the age of fourteen he went to seek his fortune in Copenhagen. He was ugly in appearance, clumsy in manners, and, with little education, he naturally failed in his search for employment, first in the theatres, and later as an operatic singer. The first series of the famous *Fairy Tales* appeared in 1835. A. also wrote travel books and an interesting Autobiography.

ANDERSON, city and county seat of Madison county, Ind., 35 miles northwest of Indianapolis, on the White River and on the New York Central and the Pennsylvania railroads. It is also the central headquarters of the Union Traction System, a network of electric railways covering the greater part of the state. A power house is located here costing \$1,000,000, the biggest in the state. Over 100 industrial plants here manufacture tin plate, glass, wire, steel springs, nails, oil and gas engines, street cars, aeroplanes, rubber tires, etc., employing 11,000 workers. Natural gas was discovered here in 1887. It has two daily papers, eight banks, 13 public schools and a manual training high school. Pop. 1920, 29,769; est. 1924, 35,201.

ANDERSON, county seat of Anderson county, S.C. fifty miles southwest of Spartanburg, on the Blue Ridge R. R. and on a branch of the Southern Pacific R. R. It is the shipping point of a large amount of cotton and corn raised in the region, but is also of considerable importance as a manufacturing center. Its industries include cotton mills, oil mills, flour mills, shingle factories and machine shops and foundries, all employing nearly 4,000 workers. It has eight public schools with 2,500 pupils. Pop. 1920, 10,570.

ANDERSON, CARLOTTA ADELE (MRS. J. SCOTT ANDERSON), (1876), an American educator in New York City. After graduating from Claverack College (N.Y.), in 1893, she took a post-graduate course for one year at the Wright-Humanson School, in New York City, training as an oral teacher of the deaf. She also studied at Teachers' College (Columbia University), then went to Rome and became interested in the Montessori system of child training. She taught the deaf at Swarthmore and Torresdale, Pa., from 1901 to 1916. She is well known as the organizer and director of Torresdale House, (connected with All-Saints Church), which was the

ANDERSON, EDWIN

first permanent building dedicated to the Montessori system in this country. Her numerous articles on that system are considered highly authoritative on the practical phase of the subject. In 1897 she married J. Scott Anderson, of Philadelphia.

ANDERSON, EDWIN HATFIELD, (1861), an American librarian, b. in Zionsville, Ind. He graduated from Wabash College, in 1883, after which he studied a year in the New York State Library School, in Albany, N.Y. His first work was to catalogue the Newberry Library, of Chicago, after which he became librarian of the Carnegie Free Library at Braddock, Pa., where he remained for three years. In 1895 he organized and became librarian of the Carnegie Library in Pittsburgh, Pa. In 1906 he became director of the New York State Library and the State Library School. Since 1913 he has been chief librarian of the New York Public Library.

ANDERSON, FRANK MALOY (1871), an American historian, b. in Omaha, Neb. Graduating from the University of Minnesota, he later studied at Harvard and in Paris, specializing in history. From 1905 to 1914 he was professor of history at the University of Minnesota, since then holding the same position at Dartmouth College. As a specialist in diplomatic history he was a member of the American delegation to the Peace Conference in Paris, in 1919. He is the author of *Outlines and Documents of English Constitutional History During the Middle Ages* (1895) and *A Handbook of the Diplomatic History of Europe, Asia and Africa, 1870-1914*.

ANDERSON, FREDERICK PAUL (1867), an American engineer, b. in S. Bend, Ind. After graduating from Purdue University, in 1890, he became director of the College of Engineering and professor of mechanical engineering at the State University of Kentucky. In 1900 he became consulting engineer for the Queen and Crescent R.R., and in 1921 director of the research laboratory of the American Society of Heating and Ventilating Engineers, in Pittsburgh, Pa.

ANDERSON, JOHN (1726-96), Scot. natural philosopher; prof. of Oriental Languages (1756), of Natural Philosophy (1760) at Glasgow Univ.; he furthered the application of science to industry, and bequeathed his property for the foundation of Anderson's College, which developed into the Glasgow and West of Scotland Technical College.

ANDERSON, VICTOR

ANDERSON, JOHN FRANCIS (1848), American engineer, b. in Jemshog, Sweden. Leaving home at an early age, he went to sea, thus arriving in this country in 1869 as a common sailor. Here he worked on engineering jobs and this practical experience, together with his own theoretical studies, enabled him to assume the position of assistant engineer in the building of the Union Pacific Railroad Bridge across the Missouri River only two years later. During the years following he constructed bridges in many parts of this country and Venezuela, England and other countries. Among his most notable works are the Hudson Tunnel, built under the Hudson River from New York City to Jersey City, in 1879-82; the Hawkesbury Bridge, in New South Wales, whose foundations are the deepest in the world; the two drainage tunnels in Brooklyn, N.Y., one a mile long and 12 feet in diameter, the other two miles long and 15 feet in diameter, and a lighthouse on a 14 feet bank in Delaware Bay.

ANDERSON, LARZ (1866), American diplomatist, b. in Paris, France, Aug. 15, 1886. After graduating from Harvard University, in 1888, he spent two years traveling abroad, after which he became second secretary in the United States Embassy in London. In 1893 he was appointed first secretary and chargé d'affaires to the United States Embassy in Rome, where he remained until the outbreak of the Spanish-American War, during which he was captain of United States Volunteers. In 1912 he was sent to Japan as Ambassador, but resigned in the following year on the change of the Administration in Washington.

ANDERSON, MARY (1859), Amer. actress, b. Sacramento, California; noted for statuesque beauty and fine voice; favorite roles, Perdita, Hermione, Galatea, Pauline, and Juliet. Retired 1889; married Antonio de Navarro, papal chamberlain (1890). Last appeared (for War funds) at Worcester (March 1916).

ANDERSON, ROBERT. See SUMTER, FORT.

ANDERSON, VICTOR CLIFTON (1862), college president and mining engineer; b. Plymouth, Mass. He became president of the Colorado School of Mines, Golden, Col., in 1917 for the second time, having held that office in 1903 to 1913. Previously he had been professor of mathematics, dean, and acting president of the Armour Institute of Technology, Chicago, as well as identified with mining as a consulting engineer. He wrote on scientific and mathematical subjects and technical

education and became a fellow of the American Association for the Advancement of Science, a member of the American Institute of Mining Engineers and of the Petroleum Technologists (London). He was the author of *The Oil Shale Industry*, published in 1920.

ANDERSON, WILLIAM FRANKLIN (1860), an American M.E. bishop, b. in Morganstown, Va. (now W.Va.). He graduated from the Drew Theological Seminary, in 1887, after which he was ordained a minister of the M.E. Church, being pastor successively of the Mott Avenue Church, in New York City, the St. James Church, in Kingston, N.Y., the Washington Square Church, in New York City and chaplain of the prison at Ossining, N.Y. He was elected a bishop in 1908. As member for Europe of the Commission of Emergency and Reconstruction of his Church he made five trips abroad during the World War. He was the author of *The Compulsion of Love*, 1904, and *The Challenge of Today*, 1915, and for a while edited "The Christian Student."

ANDERSONVILLE, a vil. of Sumter, Georgia, noted as having been the seat of a Confederate States military prison, where Union prisoners were confined during the Civil War. This prison was kept in so scandalous a condition that those incarcerated in it died by thousands. Pop. 250.

ANDES MOUNTAINS, range extending along Pacific coast, through Peru and Chile, S. America; over 4500 miles in length, between 40 and 400 in breadth; average height, 11,000 ft.; highest peak, Aconcagua (22,860 ft.), ascended by R. Rankin in 1902; gold, silver, precious stones, etc.; home of potato; district of dangerous volcanoes; range crossed by railway completed 1910 by line from Los Andes to top of Cordillera, which meets line from Mendoza.

ANDESITE, group of volcanic rocks, first investigated in the Andes, of porphyritic structure, usually dark brownish grey or green in colour; of varying constitution, they essentially consist of plagioclase feldspars, biotite, augite, and hornblende. They occur not only in America, but in Japan, Philippines, East Indies, New Zealand, and Brit. Isles (Ochils, Cheviots, and part of Lake District).

ANDORREA (42° 32' N., 1° 30' E.), republic, Franco-Span. border; under suzerainty of France, and Span. Bp. of Urgel; Council of 24; area, c. 175 sq. miles; A. obtained autonomy, IX. cent.; suzerainty belonged successively to counts of Urgel, Castello, Foin; sub-

sequently to Bourbon family. A. produces cereals, fruit, vegetables; hot springs; capital, Andorra. Pop. 5,200.

ANDOVER, town in Essex County, Mass., 22 miles north of Boston, on the Shawheen River and the Boston & Maine R.R. It is especially noted because of the location here of the Phillips Academy for Boys, founded in 1778. The Abbot Academy for Girls is also one of its institutions. Some few industries are also located here, turning out linen goods, twine, brushes and rubber goods. Pop. 1920, 8,230.

ANDRASSY, GYULA, COUNT (1823-90), Hungarian statesman, son of Julius, keen patriot and reformer; became vice-president of Hungarian Diet (1858); helped to draw up Ausgleich; first premier of Hungary, and in 1871 foreign minister for Austria. The 'Andrassy Note' (Dec. 1875) proposed concerted action by powers to secure reforms in Balkans. Helped to organize Berlin Congress and to secure protectorate over Bosnia and Herzegovina for Austria. Concluded Austro-German treaty of alliance, thus laying foundations of World War.

ANDREA, JOHANN VALENTIN (1586-1654), Ger. author; in his prose and poetry he lashed the foibles of the day; also wrote hymns and allegorical poems.

ANDRE, JOHN (1751-80), Brit. soldier, fought in America during revolutionary war; prisoner for a year; became major; selected to negotiate with Benedict Arnold for surrender of West Point; captured, tried, hanged (Oct. 2, 1780). Remains removed to Westminster Abbey 1821.

ANDREE, SALOMON AUGUST (1854-97), Swed. engineer who undertook balloon voyage to North Pole. Started from Danes I., N. W. Spitzbergen, July 11, 1897; never seen again, though message received when two days out, and buoys with dispatches picked up. Search expeditions proved fruitless.

ANDREW, APOSTLE, bro. of Peter; first of Christ's disciples; crucified, according to tradition, at Patrae in Achæa on X-shaped cross (St. A.'s cross); patron saint of Scotland and first evangeliser of Russia; St. A.'s 'day', Nov. 30.

ANDREW I. (fl. 1046-58), king of Hungary; dethroned and murdered for his efforts to introduce Christianity.

ANDREW II. (1175-1235), king of Hungary; pious but reckless, and spendthrift; f. of St. Elizabeth of Hungary.

ANDREW III. (1290-1301), king of

ANDREW, ABRAM

Hungary; conducted successful campaigns against the pope and Charles Martel.

ANDREW, A(BRAM) PIATT, JR. (1873), Am. congressman, b. in La Porte, Ind. After graduating from Princeton University he studied two years abroad, in Berlin and Paris, becoming an assistant instructor of economics at Harvard University, in 1900. Specializing in finance, he became one of the editors of the publications of the National Monetary Commission, in 1908, and, two years later, Assistant Secretary of the U.S. Treasury, a position which he held for two years. In 1921 he was elected to Congress on the Republican ticket from the Sixth Mass. Dist., to fill a vacancy. He is known as one of the leading authorities in this country on banking.

ANDREWS, CHARLES MCLEAN (1863), an American historian; b. in Wethersfield, Conn. Graduating from Johns Hopkins University, in 1889, he became, first associate, then professor of history at Bryn Mawr College. Since 1910 he has been Farnam professor of American History at Harvard University. Among his works are *The River Towns of Connecticut* (1889); *The Historical Development of Modern Europe* (1896); *The Boston Merchants of the Non-Importation Movement* (1917); *Fathers of New England and Colonial Folkways* (1919); and, in collaboration with his wife, he has edited *The Journal of a Lady of Quality* (1921).

ANDREWS, CHARLTON (1878), an American author; b. in Connersville, Ind. He graduated from De Pauw University (Ind.) in 1898, after which he was a newspaper correspondent in Paris for a year. During the following years he was successively principal of the high school in La Fayette, Ind., instructor and assistant professor at the State College of Washington, head of the English Department at the State Normal School of North Dakota, from which latter position he went to New York, in 1914, to take a position on the editorial staff of the New York Tribune. Since then he has also been instructor at the New York University and lecturer at the Brooklyn Polytechnical Institute. Among his writings are *A Parfit Gentil Knight* (1901); *The Interrupted Revels* (1910); *The Drama Today* (1913); *Ladies' Night* (1920) and a translation from the French, *Bluebeard's Eighth Wife* (1921).

ANDREWS, ELISHA BENJAMIN (1844-1917), American economist, historian, and educationalist, served in the civil war, in which he lost an eye.

ANDREYEV, LEONID

He was president of Denison University from 1875 to 1879, professor of homiletics at Newton Theological Institution from 1879 to 1882, professor of Political Economy at Brown University from 1882 to 1888, and president of the same university from 1889 to 1893. From 1900 to 1917 he was chancellor of Nebraska University. Amongst other works he wrote *Institutes of Economics*, 1889; *An Honest Dollar*, 1889; *Wealth and Moral Law*, 1894; *History of the United States*, 1894; *History of the Last Quarter Century in the United States*, 1896; and *The United States in our own Times*, 1904.

ANDREWS, IRENE OSGOOD (MRS. JOHN B. ANDREWS) (1879), an American sociologist; b. in Big Rapids, Mich., Jan. 18, 1879. In 1903 she graduated from the New York School of Philanthropy, then studied for two years at the University of Wisconsin, after which she took up her first social work in the University Settlement of Milwaukee. Following the great earthquake in San Francisco, she was sent out there by the American Red Cross to superintend the relief work. During 1907 she was head worker of the Northwestern University Settlement, in Chicago. Since 1908 she has been assistant Secretary of the American Association for Labor Legislation. Among her writings are *Minimum Wage Legislation*, *Irregular Employment and the Living Wage for Women*, and *The Economic Effects of the War Upon Women and Children in Great Britain*.

ANDREWS, ROY CHAPMAN (1884), an American naturalist and explorer, b. in Beloit, Wis., Jan. 26, 1884. He graduated from Beloit College, in 1906, after which he became assistant curator of mammals of the Eastern Hemisphere at the American Museum of Natural History. During 1908 he travelled through and explored unknown parts of Alaska; was naturalist of the U.S.S. Albatross on a voyage to the Dutch East Indies and Borneo, during 1909-10; explored North Corea during 1911-12; was with the Borden Alaska Expedition, in 1913; lead three expeditions for the Museum of Natural History, the first in Thibet and Southwest China and Borneo, in 1916-17, the second in North China and outer Mongolia, in 1919, the third in Central Asia, which left New York in 1921, to be gone for five years. He wrote many books, among which are *Whale Hunting with Gun and Camera*, 1916; *The California Gray Whale*, 1914, and *Across Mongolian Plains*, 1921.

ANDREYEV, LEONID (1871-1919);

ANDROMACHE

a Russian novelist, b. in Orel, Russia. His professional education was for the law, but instead of practicing, he took a position as reporter on a Moscow newspaper. While thus employed he began writing short stories, the first of which were published in newspapers. These stories attracted the attention of Maxim Gorky (q.v.), whose notice immediately brought Andreyev a fame which later spread all over the civilized world. Like most Russian writers, his work is deeply pessimistic, sometimes unhealthily morbid, due to the miserable social environment, as well as to the natural Russian temperament. By many European authorities his stories are considered the best of modern Russian fiction. Among his collections translated into English are *The Red Laugh*, 1905, and *The Seven Who Were Hanged*, 1909. One of his most typical stories, *Lazarus*, was published in "Current History" Magazine, in its issue of May, 1907.

ANDROMACHE (classical myth.), wife of Hector of Troy, and mother of Astyanax. Her parting with Hector, who was going into the battle in which he perished, is regarded as the most pathetic passage in Homer's *Iliad*. In the sack of Troy her son was slain before her eyes, and she herself became the spoil of Neoptolemus.

ANDROMEDA (classical myth.), dau. of Cepheus, king of Ethiopia, and his wife Cassiopeia. The latter, having boasted that her beauty surpassed that of the Nereids, Poseidon sent a sea-monster which devastated the country. It was demanded that A. should be sacrificed to appease the deity. She was exposed naked upon a rock by the seashore, but was saved from her horrible fate by Perseus, whose wife she became; after her death turned into a star. Her story has formed the subject of plays by Sophocles, Euripides and Cornelle.

ANDROMEDE, one of a system of meteors which seem to radiate from a point in constellation Andromeda, and are possibly fragments of Biela's comet.

ANDRONICUS I., COMNENUS (c. 1110-85), Byzantine emperor; app. to command in Cilicia (1152); imprisoned for participation in conspiracy against Emperor Manuel (1153); escaped, 1165; subsequently became sole emperor (1183); assassinated. A. was a remarkably talented, but licentious man, a great general, and able politician.

ANDRONICUS II., PALÆOLOGUS (1260-1332), Byzantine emperor; in his time empire was devastated by Turks.

ANEMOSCOPE

ANDRONICUS III., PALÆOLOGUS (1328-41), Byzantine emperor; dethroned preceding and fought unsuccessfully against Turks.

ANDRONICUS IV. (d. 1385), Byzantine emperor; dethroned his f. and ruled (1377-79), but the latter subsequently recovered his kingdom.

ANDROS (37° 55' N.; 24° 54' E.); Gk. island, Cyclades (q.v.) Pop. 20,000.

ANDROS ISLAND, one of the Bahamas group, has a length of 100 m., and varies in breadth from 10 to 40 m. It is low and swampy, but well timbered, and exports sponges and wool. Pop. 6000.

ANDROS, SIR EDMUND (1637-1714), Eng. colonial official, gov. of New England, Virginia, Guernsey.

ANDROSCOGGIN (44° 28' N. 70° 30' W.), river, Maine, U.S.A.

ANDUJAR, a Spanish tn. in the dist. of Andalusia in the prov. of Jaen, situated on the R. Guadalquivir. The chief manuf. carried on is porous cooling water jars. In 1808 the convention of Bayleu was signed here. Pop. 17,000.

ANEMOMETER, instrument for measuring the pressure and velocity of the wind. Best known from that of Robinson (1846), consisting of four hemispherical cups rotating horizontally with the wind; combination of wheels records number of revolutions in given time. This superseded by that of W. H. Dines. It consists of a head exposed to wind, and recording apparatus. Head has a vane formed of a tube with open end kept facing wind; underneath, a larger tube perforated with holes arranged in rings. Two tubes separately connected with pipes communicate with recording apparatus. Osler's pressure anemometer consists of plate facing wind and forced back on spring, whose resistance measures wind force. Anemometers should be placed on scaffolding some 30 ft. high, and 10 ft. above any building or tree in vicinity. They are used in mines, gas-wells, etc., as well as in meteorology.

ANEMOSCOPE, an instrument which indicates the direction of the wind, on the principle of a weather vane, in addition to which it automatically records shifting on a cylinder. Usually it is combined with an anemometer, so that both direction and force are indicated. Attached to the instrument are delicate pencils which mark on a piece of paper, wound around the cylinder, lines from which may be read a full record of wind variations

ANEMONE

during the whole twenty-four hours, the cylinder making a complete revolution in that time.

ANEMONE, a genus of Ranunculaceae, includes sev. well-known and beautiful flowers which possess the property of extreme acidity. *A. Pulsatilla*, the Pasque flower, and *A. Pratensis* are powerful emetics; the leaves of the former will raise blisters on the skin. *A. nemorosa* is the wood-anemone or 'wind-star,' *A. Hepatica*, the hepatica, and *A. coronaria* the common garden anemone.

ANEROID, a term applied to a barometer in which the pressure of the air is measured without the use of mercury or other liquid. It consists essentially of a hollow box of elastic metal in which there is rarefied air. Any external pressure causes a proportionate amount of compression of this box, which is conveyed through a multiplying arrangement to the pointer on the dial. A preliminary graduation in comparison with a good mercury barometer enables the atmospheric pressure to be shown.

ANEURISM, a cavity communicating with the interior of an artery, containing blood, usually formed by the dilated or pouched wall of the artery.

ANGEL (Gk. *angelos*, messenger), term generally used for spiritual beings intermediate between God and man. In Old Testament religion before monotheism became definite, Hebrew 'Elohim' (God) is used of beings inferior to Jahweh. The '*Malakh Jahweh*,' 'messenger of the Lord,' is spoken of, but no other mention of a's. Possibly earlier references have been modified by later monotheism. After the Exile Jewish religion was influenced by Zoroastrianism, particularly in angelology and demonology; hence we find a's in *Ezekiel*. A's appear in New Testament. In St. Paul's view a's were created through Christ (*Colossians 1:16*). Later Christian thought as regards a's has been much influenced by Pseudo-Dionysius.

ANGEL FISH, MONK FISH, MONGREL SKATE, SHARK RAY (*Rhina squatina*), a Selachian (q.v.) intermediate between the sharks and rays, with flat body and pectoral fins which project in front, suggesting the top of an angel's wings; length, c. 5 ft.; found in tropical and temperate seas.

ANGELES, FILIPE (1869-1919); a Mexican general, b. in the State of Hidalgo; d. in Chihuahua, Nov. 26, 1919. He was the son of an army officer

ANGELL, JAMES

who fought against Maximilian under Juarez, of half Indian blood. Graduating from the military academy at Chapultepec, he went abroad and finished his military training in an artillery school in France. In 1912 he joined the revolution under Madero, and when that leader was betrayed by Huerta, was imprisoned with him. Later he was released on condition that he go abroad, but when Carranza began his movement against Huerta, Gen. Angeles joined him, becoming especially attached to Francisco Villa, whose chief of staff he became after the split with Carranza. In November, 1919, he was captured by the forces of President Carranza and a few days later executed, against many protests from abroad and this country, where he was universally respected as a humane and brilliant soldier.

ANGELICO, FRA (1387-1455); Ital. religious artist; his real Christian name was Guido Giovanni his religious and assumed name; became a Dominican, 1408; said to have refused archbishopric of Florence; painted in Florence, especially at convent of S. Marco, frescoes which still survive, and in the Vatican at Rome, and elsewhere; a man of very saintly life. His paintings are spiritual and beautiful, but not robust enough for some tastes.

ANGELL, GEORGE THORNDIKE (1823-1909), Amer. philanthropist.

ANGELL, JAMES BURRILL (1829-1916), an American educator and diplomat, b. in Scituate, R. I. He graduated from Brown University, in 1849, then, after serving as librarian of the university for a year, continued his studies abroad for three years. On his return he became professor of modern languages and literature at Brown University. From 1860 till 1866 he was editor of *The Providence Journal*, relinquishing that position to become president of the University of Vermont, and, later, president of the University of Michigan. In 1880-1 he was U.S. Minister to China, and in 1897-8 Minister to Turkey. He was the author of *Progress in International Law*, 1875; *The Higher Education*, 1897, and his own *Reminiscences*, 1912.

ANGELL, JAMES ROWLAND (1869); an American university president, b. in Burlington, Vt. Graduating from the University of Michigan, in 1890, he took a two years' post-graduate course at Harvard University, followed by courses at the universities in Berlin and Halle, Germany, and a period of travel on the Continent. Returning home, in 1893, he began teaching

philosophy at the University of Minnesota. A year later he went to the University of Chicago, there to become assistant professor of psychology and director of the psychological laboratory. In 1905 he became professor and head of the department of psychology. From 1918 till the following year he was acting president of the institution. During the period that the U.S. Army was being recruited and organized for operations against Germany during the World War, Prof. Angell assisted the War Department as expert psychologist in classifying the personnel of the military organization. In 1921 he became president of Yale University. Among his most notable works are *Psychology*, four editions, 1908 and *Chapters from Modern Psychology*, 1911.

ANGELL, NORMAN (1874), pen-name of Ralph Lane, journalist; author of *The Great Illusion* (1910), showing futility of war and consequent general impoverishment, even of victors.

ANGELO, MICHAEL See MICHEL-ANGELO.

ANGELUS, THE, R.C. devotion; at 6 a.m., noon, and 6 p.m. church bells are rung (3 strokes three times, and once 9 strokes), during which antiphons and prayers commemorative of the birth of Christ are said.

ANGERS (47° 27' N.; 0° 34' W.), town, France, on Maine; ancient capital of Anjou; fine cathedral; old castle; Catholic Univ.; Episcopal see; birthplace of sculptor David; wine, woollens, cottons, corn, slate. Pop. 86,158.

ANGEVIN LINE, Eng. kings from Henry II. to Richard III., of the families of York, Lancaster, and Plantagenet. The name is derived from Henry II., who was s. of Geoffrey, Count of Anjou.

ANGILBERT, SAINT (c. 740-814), the friend and counsellor of Charlemagne, whose daughter, Bertha, he married. He ultimately became a monk. He was a distinguished poet and was described by Charlemagne as the 'Homer of the Age.'

ANGLIN, MARGARET FRANCES MARY (1876), an American actress, b. in Ottawa, Ont. She was educated in a Catholic convent, then studied in and graduated from the Empire School of Dramatic Acting, in New York City, in 1894. She first appeared in Shenandoah, in the following year, then played opposite James O'Neil for several seasons, principally in 'The Girl I Left Behind Me.' She reached the zenith of her popularity as Roxane in 'Cyrano

de Bergerac,' with Richard Mansfield. Later she starred with Henry Miller in 'Mrs. Dane's Defense,' 'The Only Way' and 'The Great Divide.' More recently she has assumed the responsibility of producing her own plays, among these being *The Awakening of Helena Ritchie*, 1909; *The Woman in Bronze*, 1919, and *The Sea Woman*, 1923.

ANGINA PECTORIS, sudden paroxysms of pain in the region of the heart, due to disease of the heart, aorta, or coronary arteries; amyl nitrite almost invariably gives relief.

ANGIOSPERMS, the most highly specialized plants, having the seed in a closed ovary in contradistinction to gymnosperms (q.v.). The class includes the majority of flowering plants, and is divided into Monocotyledons (q.v.) and Dicotyledons (q.v.). See PLANTS.

J. Coulter and C. J. Chamberlain; *Morphology of Angiosperms* (Chicago, 1903).

ANGLE, commonly the space between two intersecting straight lines. *Right a.* (90°), when lines form four equal angles; *acute a.*, smaller; *obtuse a.*, larger than right a. (plane geom.); space contained between planes intersecting in one point (solid geom.); *curvilinear a.*, between two curves; and *mixed a.*, between curve and straight line, are determined by a. between tangents at point of intersection. See TRIGONOMETRY.

ANGLER (*Lophius piscatorius*); flattened Teleostean fish of European coasts, preying on small fish and fry. Protective coloring and fringed appendages conceal it effectively among sand and seaweed; a long filament with plate at tip, a modified spine of anterior dorsal fin, lures prey within reach of its large jaws.

ANGLES, OR ANGLI, a Ger. tribe who occupied the dist. of Schleswig-Holstein, a large number of whom came to Britain in the fifth century and settled in E. Anglia, Mercia, and Northumbria. From them the name 'England' is derived (Angleland). These people were first mentioned by Tacitus, and Lindenberg and Leibnitz have preserved fragments of the anct. laws used in common by the Angli and the Varini.

ANGLESEY, ANGLESEA (53° 17' N.; 4° 20' W.), county, N.W. Wales; separated from mainland by Menai Strait; surface comparatively flat; lead, copper, zinc; Holyhead, port for Irish service; possessed in turn by Druids, Romans, Irish, Danes, English; area, c. 276 sq. miles. Pop. 1921, 51,695.

ANGLIA, E., a kingdom founded by Uffa in 575, which consisted of Norfolk, Suffolk, Cambridge, and the Isle of Ely, and formed one of the kingdoms of the Saxon Heptarchy. It was afterwards dependent on Mercia, and submitted to Egbert, King of Wessex, in 826. Soon after it was invaded by the Northmen, and became a Danish kingdom, until it was taken by Edward the Elder, 921. Under Canute it was one of the four great earldoms, the other three being Northumbria, Mercia, and Wessex.

ANGLING, the art of catching fish by means of a line and baited hook, is a pursuit of great antiquity, being mentioned in the *Book of Isaiah* and in the *Odyssey* of Homer, while prehistoric fish-hooks of different materials have been found in many widely separated parts of the earth. Its popularity as a sport has increased enormously during the last cent., and legislation now assists the preservation of fish by enforcing close times, while many rivers and lakes are systematically stocked.

ANGLO-JAPANESE TREATY, an agreement between Great Britain and Japan, first signed on June 30, 1902. Its chief object was the safeguarding of both nations in China and Korea. A declaration was made in the treaty that neither of the contracting powers was to use its influence, by design or aggression, in the countries named, and equal opportunities were promised in China and Korea to carry on commerce with all nations. The treaty emphasized the peculiar interests of Japan and Korea, and each nation promised aid to the other in the event of disorder, or if any aggressive action should be taken by any power on the countries named. The two countries agreed also to make war and conclude wars in common. The new treaty was signed on August 12, 1905, which preceded the earlier one. Its provisions were practically the same except that it included the regions of eastern Asia and of India. The treaty was to run for ten years, and it was renewed for an additional ten years on July 13, 1911. The Anglo-Japanese Treaty was one of the reasons for Japan's entrance in the World War.

At the Conference for the Limitation of Armament held in Washington in 1921-2, the abrogation of this treaty was one of the essential requirements of the so-called Four-Power Treaty, by which the parties participating in the Conference agreed to respect each other's rights in the Far East. Japan finally consented to the abrogation of the treaty, which was superseded by the Four-Power Treaty.

ANGLOMANIA, term used in France, Germany, and U.S., to signify unbounded admiration and imitation of things English. Very marked in France and Germany during second half of 18th cent., owing to Voltaire, Montesquieu, and Rousseau, who held up for emulation English political institutions. In U.S., after period of Gallomania (1864-70), smart set became ultra-English. Opposite tendency, known as *Anglophobia*, specially marked in case of Frederick the Great (after 1762) and Napoleon, also after Fashoda incident (1898), and during Boer War; most intense in Germany before and during World War, when *Gottstrafe-England* attitude assumed various grotesque forms and found literary expressions in Lissauer's *Hymn of Hate*.

ANGLO-NORMAN, term used to describe literature, etc., of Normans in England. See **ENGLAND: Literature, Language**.

ANGLO-PERSIAN TREATY, an agreement signed between Great Britain and Persia on August 9, 1919. Great Britain agreed to furnish, at the expense of Persia, military officers and equipment for an army which should maintain order in Persia. They also offered a loan of £2000,000, redeemable in twenty years. Persia gave to Great Britain economic and political concessions which, it was claimed by many, especially by the French, established a virtual protectorate over the country. The British Government, however, asserted that Persian independence was not imperilled by the agreement and denied any purpose for creating a protectorate.

ANGLOPHILE, to favor Eng. manner or policy; also the person who does so.

ANGLO-SAXON, term loosely applied to Teutonic tribes who conquered Britain (V.-VI. cent.); also to their language and lit. as opposed to those of their kinsmen on Continent. Philologist and literary historians prefer term Old English. See **ENGLAND: History, Literature**.

ANGLO-SAXON CHRONICLES, name given to a series of six manuscripts, written at various times and in different places, of the first importance as authorities for early Eng. history. They are believed to have been commenced during the IX. cent., were reduced to something like chronological form during the reign of Alfred, and end about 1154. Some of the MSS. contain poems, including the narrative of the famous battle of *Brannanburh* (937).

ANGOLA, general name for whole of Port. terr. in W. Africa, having

ANGONILAND

Congo Free State on N. and N.E., British Central Africa on S. and S.E., protectorate of S.W. Africa (formerly German S.W. Africa) on S., and Atlantic on W. Area, 484,000 sq. m. Extensive mt. range in N. forming watershed between Atlantic-flowing and Congo-flowing rivers. S. is great plateaus (alt. 5,000-6,500 ft. highest peak in Lovile Mts., 7,800 ft.); colony well watered; chief riv. Coanza (520 m., navigable 200 m. up); interior cool and dry; in low-lying parts malaria endemic. Natural resources chiefly vegetable, but also copper, iron, malachite, petroleum, salt, and auriferous deposits. Exports rubber, beeswax, oil, palm kernels, palm oil, sugar, corn, beans, cotton, and whale-fishing products; transit of goods free of customs duty (Nov. 1913); total length of railways open, 818 m. (1916); others proposed to link up with Central African Rys.; colony sends two deputies to Port. parliament; under governor residing at Loanda, cap.; chief ports, Ambriz, Benguella, Mossamedes, and Lobito. Pop. chiefly Bantu-Negro, between 4,000,000 and 7,000,000. Colony has belonged to Portugal since 1575 (Dutch 1641-8). See MAP AFRICA.

ANGONILAND, plateau of Barotseland, N.E. Rhodesia (13° 33'-14° 46' N., 32° 31'-34° 38' E.); average alt., 4,000 ft.; inhabited by Angoni owning herds of cattle, sheep, and goats. Of considerable geological interest.

ANGORA—(1) Inland vilayet, Asia Minor, between mts. of Taurus and Anti-Taurus, 200 m. E.S.E. of Constantinople. Watered by Sakkaria, Kezel, Irmak, and tribs.; three-fourths under cultivation; wheat, barley, rice, and fruit. Staple export, mohair, silky fleece of white Angora goat (Angora wool); rich silver and copper mines; and hot springs. Area, 27,370 sq. m.; pop. 932,800 (Moslems, 763,000; Christians, 128,300). (2) City (anc. *Ancyra*), cap. of above (39° 57' N., 32° 53' E.); bishop's see; dismal place; remains of Græco-Roman and Byzantine architecture. Angora was the cap. of the Nationalist Turkish Republic established in 1920 by Mustapha Kemal. See **TURKEY, ASIA-MINOR**. Pop. 28,000 (Christians, 9,300).

ANGOSTURA (Santo Tomé de la Nueva Guayana), now Ciudad Bolívar, on the Orinoco, is the cap. of Bolívar, in the republic of Venezuela, S. America. It trades in indigo, sugar, tobacco, cotton, horses, cattle, dried meats, and skins. The Orinoco here narrows, giving its name to the city, which signifies *strait*. It was founded

ANHYDROUS

in 1764, and is the seat of a bishop. Pop. 12,000.

ANGOULÊME (45° 39' N., 0° 9' E.); cathedral town, Charente, France; has assize court, theatre, hospitals, museums; manufactures paper, cognac, machinery. Pop. 1911, 38,200.

ANGOULÊME, CHARLES DE VA-LOIS, DUC D' (1573-1650), illegitimate s. of Fr. King Charles IX.; grand prior of order of Malta (1589); served in Fr. army; received duchy of A. as a legacy (1619).

ANGOULÊME, LOUIS ANTOINE DE BOURBON, DUC D' (1775-1844), s. of Charles X. of France; after 1830 abandoned claim to throne; lived in exile.

ANGRA DO HEROISMO, a seaport in Terceira, and cap. both of Terceira and of the whole group of the Azores. It is strongly fortified, has a cathedral, fine churches, a military college, and an arsenal. It exports grain and wine, but its harbor is very much exposed. Pop. 11,000.

ANGRA PEQUENA, seapt. and bay (26° 38' S., 15° E.), protectorate of S.W. Africa; called by Germans Luderitz Bay, after name of trader who established himself there in 1883; proclaimed Ger. protectorate (1884), which became nucleus of Ger. S.W. Africa. Good natural harbor; well-built town; surrounding country no vegetation; water obtained by large condensing plant, but before World War natural supply discovered near Aus, and works in progress. Diamonds found in 1908; climate healthy; captured by Botha without opposition, Sept. 18, 1914, and occupied again in Feb. 1915.

ANHALT (51° 47' N., 12° E.), former duchy, central Germany; area, 888 sq. miles; eastern part flat and fertile, watered by Elbe and Saale, produces wheat, flax, rape, hops, tobacco; western part, towards Harz Mountains, has great mineral wealth—lignite, silver, lead, copper, hematite; sugar manufacture, brewing, distilling. Capital, Dessau. Duchy was formed in 1863 by combining duchies of A.-Desau-Köthen and A.-Bernburg; became Imperial State, 1871. In 1919 it was established as the Free State of Anhalt. Pop. 331,258.

ANHYDRIDE, an oxide which will combine chemically with water; term generally applied to acidic oxides; (e.g.) sulphur trioxide is sulphuric anhydride, because it combines with water, forming sulphuric acid.

ANHYDROUS (=without water);

ANILINE

term used to describe the state of a chemical substance freed from water.

ANILINE (Amidobenzene, Phenylamine), $C_6H_5NH_2$, colorless, malodorous, oily, poisonous liquid; M.P. -8° , B.P. 183° . Resinifies in air, forms salts with mineral acids; its compounds and by-products are of immense commercial value, used in dyeing industry and therapeutics. See NITRO-COMPOUNDS.

ANILINE DYES, the name given to a large group of dyestuffs, not necessarily derived from aniline, but having their origin in organic compounds distilled from coal-tar. Hence the name, 'coal tar colors.' They are usually easier to manipulate than natural coloring matters, more reliable in their effects, cheaper and more lasting, while the range of colors is very wide. The first of these dyes was discovered in 1856 by the English chemist, Perkin, who prepared mauve from aniline, which in turn was made from benzene distilled from coal-tar. This was the origin of the name 'Aniline Dye.' Today, several hundred entirely different dyestuffs of this class are manufactured. They may be classified into the following groups: *Nitro-dyestuffs*, used on wool and silk, the most important being aurentia, picric acid, Victoria orange, palatine orange, and naphthol yellow. *The phenylmethane group*, including methyl violet, magenta, malachite green and auramine. On sulphonation these compounds yield such dyes as acid violet, acid megenta, etc. They are used on both wool and cotton, but are not fast colors. *The azo-group* in which are included nearly all the direct dyes. These colors are largely used for cotton and for mixtures of cotton and wool. Their fastness to light varies considerably, and as a rule they are not fast to washing when used on cotton. *The Alizarin colors*, including yellow, red, green, black, indigo, brown and purple. In this class occur the mordant dyestuffs, which are always used in conjunction with a metallic mordant. They can be applied to cotton, silk and wool and are very fast both to light and washing. *The Phthalein group*, including eosins and rhodamines. These dyes are characterized by their remarkable brilliancy, but they are fugitive to light.

Miscellaneous colors, of which the most important is aniline black. The latter is produced by the oxidation of aniline, during which three consecutive products are formed. The first is Emeraldine, a greenish insoluble material; the second is Nigraniline, which gives a violet black, while the third is true Aniline Black, sometimes called 'ungreenable black,' which is extremely fast to light, bleaching and washing.

ANIMAL KINGDOM

ANIMAL HEAT. All living matter is in constant state of change, involving chemical reactions giving rise to heat. Absence of heat prevents these chemical changes, and death ensues. On the other hand, within certain limits, increase in heat hastens these changes and uses up body too quickly—(e.g.), rapid wasting accompanies high fever. In some animals (cold-blooded) body heat readily affected by external conditions; in higher animals heat normally retained at uniform level. Processes of oxidation produce body heat; fats have highest calorific value; man doing ordinary work evolves daily 3,000 calories. In man, heat of blood $98.4^\circ F.$, and only moves up and down some tenths of a degree; this dependent on a fine adjustment between mechanism of heat production and that controlling its loss.

ANIMAL KINGDOM, one of the three great divisions—the other two being plants and minerals—into which natural objects were at one time classified. Modern research has shown the close connection between simple plants and simple animals, and thus destroyed the basis of this primitive classification.

The prime difference between animal and plant is the difference of diet. A green plant can in sunshine form its own carbohydrates (starch, sugar, etc.), and if supplied with water and salts, can build up protoplasm under these conditions. An animal must have its carbohydrates ready made, and is incapable of existing unless also supplied with protoids in some form—(e.g.), while a plant requires only simple food, which it absorbs in solution, an animal requires complex food, usually taken in solid form. But some simple forms contain the green coloring matter chlorophyll, and are capable of feeding like plants.

Again: most animals get rid of nitrogenous waste products, which plants do not. They are usually more definite in form than plants; and their component cells are not surrounded by cellulose, as those of plants are. Cellulose does, however, occur in tunicates, or sea squirts. As a rule, animals exhibit much greater histological differentiation than do plants. The older statement that animals move about and plants do not, can no longer be accepted in view of the fact that some animals are sedentary, and that certain microscopic plants and the swarmspores of some higher plants move about as freely as animals do.

Animals, like plants, are composed of protoplasm, or living matter, and, like them, exhibit the five prime organic functions. They are contractile, or

capable of movement; they are sensitive; they nourish themselves; they breathe; they excrete. In addition, they are periodically capable of growth and reproduction. From inorganic substances—the minerals of the old classification—both animals and plants differ in their power of growing at the expense of substances different from themselves, and in the fact that, although they are undergoing constant change, they remain apparently the same for long periods.

The following are the chief groups of the animal kingdom:—

A. Vertebrata: animals with (a) a dorsal tubular nervous system; (b) a dorsal axis, known as the notochord, which in the higher forms is replaced at an early stage by the backbone; (c) gill slits, or their equivalents, the visceral clefts, which are openings from the mouth cavity to the exterior—(1) Mammals; (2) Birds; (3) Reptiles; (4) Amphibia; (5) Fishes; (6) Cyclostomata, or round-mouths; (7) Protochordata, including the lancelet and sea-squirt.

B. Invertebrata: animals with ventral nervous system, with no backbone or notochord, and no gill slits—(1) Molluscs, or shell-fish; (2) Arthropods (crustacea, insects, arachnids, etc.); (3) Echinoderms (star-fish, sea urchins, etc.); (4) Annelids, or segmented worms; (5) Unsegmented worms; (6) Coelentera, of hollow-bodied animals; (7) Sponges; (8) Protozoa.

ANIMAL PSYCHOLOGY, sometimes called 'comparative psychology,' is that branch of the science which studies the manifestation of mind in the lower animals. With regard to the existence of conscious and reasoning intelligence in animals lower than man there are three schools of opinion. The first maintains that there is no mind below man, and that the behavior of animals is merely a group of physiological manifestations. The second holds that mind exists in all animals, even in the lowest forms of life. The third takes an intermediate position and believes that whereas conscious intelligence does not exist in such low forms of life as the amoeba, it does exist to a high degree in those animals which more nearly approximate, physiologically, to man. It is obvious that some criterion of mind is necessary as a basis of discussion, and it has been suggested that the capacity for modifying behavior by experience should be taken as evidence of the existence of mind. To illustrate this definition in a simple manner it may be said that 'the burnt child fears the fire,' because it reasons, from its experience, that fire in contact with the body causes pain. The child possesses 'associative memory,'

and modifies his behavior accordingly. An attempt to apply this criterion to the behavior of lower animals reveals its vagueness, and the objection is raised by some critics that all animals, and even some inanimate objects, modify their behavior under the continued influence of an outside agent. The change in the 'behavior' of the wood of an old violin under the influence of the strings has been quoted as an example.

To illustrate the nature of the experiments made in order to discover the reasoning powers of animals, 'the puzzle box' and the 'maze' may be quoted. In the first the animal is placed in a cage and in order to attain its freedom has to unfasten a series of latches. In the second, the animal is taught to find its way through a maze, and is then left to do so, unaided. The experiments are elaborated by destroying parts of the central nervous system or of the peripheral sense organs, and noting the effect upon the animals' actions.

The option generally held today is that mind exists in all animals, even in the lowest forms. Such a theory is in agreement with the doctrine of evolution, which maintains that man, mentally as well as physically, has developed from simpler forms of life.

ANIMISM, the doctrine of souls and other spiritual beings. Through the medium of dreams, phantoms, and other agencies, primitive man is driven to believe in spiritual existence—i.e., to refuse to identify life with matter in all cases. Thus attributing vaguely his own life to a spirit within himself, he proceeds by analogy to trace the changes and movements of the external world as being due to similar causes. He has not learned to differentiate conscious and unconscious existence, he cannot define personality, but he looks on all nature—rivers, mountains, winds, storms, rocks, stones, plants, and animals—as being the abode of spirits. The drama of nature around him, its successions of repose and strife, lead him to think of these spiritual beings as capable of assuming various forms—mineral, vegetable, animal; his instinct for a unity in nature makes such a continuity of life, a transmigration of soul, appear a likely process; and this stage of thought, in which soul or spirit is attributed to all natural objects, is called *Animism*.

ANIO (modern Aniene or Teverone), a trib. of the Tiber, in Central Italy, which, after a course of 70 m., passing Tivoli, joins the main stream 3 m. above Rome. Since the third century its aqueducts have supplied Rome with water.

ANISE (*Pimpinella Anisum*), umbelliferous plant of S. Europe and Levant; fruits (aniseed) used for preparation of oil of anise, used medicinally (as stomachic), and for confectionery and liqueurs.

ANJOU (47° 27' N., 0° 25' W.), former county, France, now forms most of Maine-et-Loire and part of Mayenne, Sarthe, Indre-et-Loire; capital was Angers. In early times often ravaged by Normans; county held by Fulk the Red in late IX. cent.; passed in 1060 to house of Gatinals, to which belonged Geoffrey IV. of A. (Plantagenet), who in 1128 m. Matilda, dau. of Henry I. of England; his s. became Henry II. of England, and A. remained an Eng. province until lost to France by King John, 1203; given in 1246 by Louis IX. to Charles, king of Naples and Sicily, coming by marriage to house of Valois; given by King John to s., Louis I. of Naples; belonged to kings of Naples till death of René, 1480; subsequently an appanage of Fr. crown.

ANKLE, the joint between the leg and the foot.

ANKOLE (0° 10' S., 31° E.), fertile district, Uganda, Brit. E. Africa; minerals.

ANKYLOSTOMIASIS, a disease caused by a worm (*Ankylostoma duodenale*), $\frac{1}{8}$ - $\frac{1}{2}$ inch in length, which makes its habitat in the upper part of the human small intestine.

ANNA COMNENA (b. 1083), Gk. historian; dau. of Alexius I., Byzantine emperor, whose life she wrote.

ANNA IVANOVNA (1693-1740), Empress of Russia; niece and successor of Peter the Great (1730); allowed paramour, Biren, to tyrannize over empire.

ANNALS, chronological summary of events; term derived from *Annales Pontificum* or *Annales Maximi* of early Rome, compiled by Pontifex Maximus; annually recorded magistrates' names and noteworthy events; mediæval a's a development of 'Paschal' tables of early Western Church.

Compilers of a's on Roman history from Second Punic War to I. cent. B.C. were at times called Annalists; among them were Fabius Pictor (II. cent. B.C.), Cincius Alimentus (both writing in Greek), and M. Porcius Cato (in Latin).

ANNAM, OR ANAM, Fr. protectorate E. side of Indo-China, between Tonking and Cochín-China (11°-21°N., 104°-109° E.); long narrow dist., area 52,100 sq. miles; mountainous except along coast, where extensive rice-fields employ most of the people; tropical

products generally; sugar-cane near Tourane. Iron, wood, teak, dyewoods, lacquer on hills; minerals include coal, iron, gold, silver. Several good harbors—Tourane Bay, Hon Kohe, Phanthiet; cap. Hué. Rainy season September to January; people Mongolian race, professing Buddhism and Confucianism (educated class). Acquired by French (1862-74). Annamese soldiers were employed by French on Western front during World War. Pop. 5,000,000.

ANNAPOLIS, a city of Maryland, the capital of the State, and the county seat of Anne Arundel co. It is on the Severn River and on several railroads. Annapolis is about 40 miles east of Washington. There are several important public buildings, St. John's College, and other institutions. The city is best known, however, as the seat of the United States Naval Academy. Annapolis was founded in 1641. It was first named Providence and received its present name in honor of Queen Anne, in 1708. The first Constitutional Convention was held here in 1786 and here Washington surrendered his commission in the army, in the Senate room of the State House. Pop. 1920, 11,214.

ANNAPOLIS (44° 45' N., 65° 34' W.), seaport, Nova Scotia.

ANN ARBOR, a city of Michigan, in Washtenaw co., of which it is the county seat. It is on the Michigan Central Railroad, and on the Huron River. It is an important industrial community and has manufactures of farm implements, woolen goods, furniture, carriages and organs. The surrounding country is an important agricultural region of which Ann Arbor is the center. It is the seat of the University of Michigan. Pop. 1920, 19,516.

ANNE (1665-1714), Queen of Great Britain and Ireland; second dau. of James II. by Anne Hyde; m. Prince George of Denmark (1683); succ., 1702. Her accession marked a violent reflux of Tory feeling. A Tory ministry, headed by Godolphin was established. Marlborough and his hectoring wife managed the Queen. Marlborough (now cr. Captain-General and Duke), a brilliant general, continued war begun by William III. Marlborough-Godolphin ministry lasted till 1710 (Sunderland a violent Whig, was introduced 1706), and was distinguished by victories of Blenheim, Ramillies, Oudenarde, Malplaquet, capture of Gibraltar; expulsion of French from Flanders and Germany; and Union with Scotland. Between 1708-10 the Tory ministry became a Whig one. Its

ANNE OF AUSTRIA

attitude to war and Church made it unpopular. Harley (dismissed 1708), kept Queen's confidence through back-door influence of Abigail Masham, who supplanted the termagant Duchess of Marlborough in Anne's favor. Impeachment of Sacheverell (1710) was followed by fall of Whigs and formation of Harley Cabinet. The Duchess had to resign her key of office, and Marlborough was disgraced (1711). Harley (now Lord Treasurer and Earl of Oxford) concluded Peace of Utrecht (1713). Only one of A.'s many children survived infancy, and he d. at the age of eleven. The succession question divided the Tory party. Oxford was dismissed (July, 1714), and Bolingbroke became Prime Minister. His plans for a Jacobite Restoration, however, were defeated by Anne's death and intervention of Whig lords; Elector of Hanover suc. as George I. Anne's reign witnessed a great spiritual revival and much political and intellectual activity. Dull, obstinate, but homely and good-natured, A. was deeply religious and 'entirely English' at heart.

ANNE OF AUSTRIA (1610-66), dau. of Philip III. of Spain, wife of Louis XIII., and mother of Louis XIV.; regent on death of husband, with Cardinal Mazarin for minister; triumphed over Fronde (q.v.); retired to convent on death of Mazarin.

ANNE OF BOHEMIA (1366-94), dau. of Charles IV. of Germany; queen of Richard II. of England.

ANNE OF BRITTANY (1477-1514), wife of Charles VIII. of France, and afterwards of Louis XII.; added Brittany to France.

ANNE OF CLEVES (1515-57), fourth wife of Henry VIII.; unprepossessing appearance; marriage (Jan. 1540), arranged from political motives by the unfortunate Cromwell, was dissolved in six months. A. retired with a pension, d. at Chelsea.

ANNE OF DENMARK (1574-1619), wife of James VI. of Scotland (I. of England); m. at Opslo (1589); Prince Henry (b. 1594, d. 1612); crowned with James after Elizabeth's death (1603). A. was extravagant and pleasure-loving, but was nevertheless a faithful wife and devoted mother.

ANNE, ST., ANNA, wife of St. Joachim and mother of Virgin Mary. patron saint of carpentry; festival, July 26.

ANNEALING, process of making a substance, especially glass, iron, or steel, homogenous and less brittle by slow

ANNULAR

cooling from a high temperature. If cooled rapidly (e.g.), in water or oil, many metals are hardened, but require tempering (to prevent subsequent cracking) by being subjected to a certain heating up, the requisite temperature in the case of steel being judged from experience or by its color. *Case-hardening* means giving the outer part of a wrought-iron or mild steel object a special hardness, as is necessary (e.g.), in eyes of levers, link motions of engines, etc.

ANNEXATION, the act of seizing anything; in international law, the act of adding foreign territory to a state, either by forcible seizure or by the voluntary cession of one state, or power to another in the interests of peace, or from some other cause.

ANNISTON (33° 40' N., 85° 50' W.); town, Alabama. Pop. 1920, 17,734.

ANNONAY, tn. of dept. of Ardeche; in the S.E. of France. It manufs. leather (for gloves), paper, etc. Pop. about 15,000.

ANNUALS, books of which new edition or further member of series is published annually. These include desk-books containing useful information, and literary annuals which preceded present Christmas number issue of most periodicals. Old literary annuals, now rare, started with *Forget-me-Not* (1822-44); among treasures of this kind are *The Literary Souvenir* (1824-34), to which important literary men contributed; *The Keepsake* (1827-56), for which Scott wrote; and *The Book of Beauty* (1833-56), edited by the famous Countess of Blessington. Among numerous modern annuals are Whitaker's *Almanack*; *The Statesman's Year-Book*; Hazell's *Annual*; *Who's Who*; *Who's Who in America*; Crockford's *Clerical Directory*; *World Almanac*.

In botany, annuals are plants which germinate, flower, fruit, and die in a year.

ANNUITY, an amount of money, payable annually or at shorter intervals, either for a period of years or during the continuance of a person's life. Unless the contrary is stated, the word 'annuity' is understood to mean a life a. The Brit. Government grants a's in exchange for stock, the residue from the expired a's being devoted to the reduction of the National Debt. Government a's are also obtainable through the Post Office, of amounts from £1 up to £100; see *Insurance as a Means of Investment*, by W. A. Robertson.

ANNULAR, adjective applied to solid

formed by closed curve rotating round axis outside it (math's); ligaments at wrist or ankle (anat.); duct strengthened by thickened layers forming rings (bot.).

ANNUNCIATION, THE, announcement of Christ's Incarnation to the Virgin Mary; feast (Lady Day), March 25.—Annunciation, The Supreme Order of the, knighthood order of house of Savoy.

ANNUNZIO, GABRIELE D', See D'ANNUNZIO.

ANNUS, MIRABILIS (marvellous yr.) name given to 1666; poem of Dryden called A. M. describes victory over Dutch and Great Fire of London of that year.

ANODE, the electrode, or terminal, of an electric battery, through which the positive current enters, one of two such terminals, the other being known as the cathode. The anode is a plate, or rod, of zinc, while the cathode is a plate of carbon, or copper, or platinum.

ANODYNES, OR ANALGESICS, medicines which relieve pain by their action on the brain, or their influence over the conductivity of the sensory nerve fibre. The principal a. are opium, Indian hemp, belladonna, aconite, chloroform, antifebrin, antipyrine, etc. They should never be used except in accordance with the advice of a medical man. *Hoffman's A.* is a colorless liquid consisting of ether, alcohol, and ethereal oil; it is used in nervous irritation, angina pectoris, and asthma. *A. colloid* is an unofficial remedy used for painting over the course of nerves in neuralgia, sciatica, etc.

ANOMALY.—In a body revolving about a center of attraction (like the earth round the sun) the nearest point to that center is called the *pericenter* of the orbit. When the earth is at its pericenter it is said to be in *perihelion*, and in *aphelion* when farthest away. *A.* is the angular distance of a body from the pericenter of its orbit; and an *anomalistic year* is the time taken by a planet to pass from any given a. to the same again. It is convenient to reckon it for the earth from one to the next passage of the pericenter, and as this moves slightly the anomalistic year is 4 minutes 39.02 seconds greater than a sidereal year.

ANONYMITY, omission of name of author from his production (cf. *Pseudonymity*, use of false name). Many literary productions, like *Aucassin et Nicolette*, obstinately continue to conceal their authorship, but others yield to scholars' labors; progress of criticism

in modern times has done much to discover secrets of styles and unmask a. Some treatments of this subject are Halkett and Laing, *Dictionary of the Anonymous and Pseudonymous Literature of Great Britain* (1881-88); Cushing, *Anonyms* (1890); Melzi, *Dizionario di opere anonime e pseudonime di scrittori italiani* (1884-59) with *Appendice* (1887); Quérard, *Supercherie littéraire dévoilée* (1869-71); Barbier, *Dictionnaire des ouvrages anonymes et pseudonymes* (1872-79); Brunet's *Supplément* (1889); *Deutsche Anonymenlexikon* (1902-3). Britain, America, and Germany largely employ a. in journalism, but France passed a law, 1850, by which all political and religious manifestations must be signed.

ANSBACH, ANSPACH (49° 19' N., 10° 34' E.), town, Bavaria; machinery, weaving. Pop. 20,000.

ANSELL, SAMUEL TILDEN (1875); an American soldier and jurist, b. in Coinjock, N. C. He graduated from the U.S. Military Academy, at West Point, in 1899, then entered into army service, reaching the rank of brigadier-general in 1917. Specializing in law, he served as prosecuting attorney in the Moro provinces in the Philippines, under the civil government, during 1909-11. Later he was assigned to serve as attorney before Federal courts of the United States in both the Philippines and Porto Rico. Shortly after the war against Germany he took the leading part in initiating a reform of the courts-martial system of the United States Army. In 1919 he resigned from the service to take up a private law practice.

ANSELM ST (c. 1033-1109), prelate and theologian. b. Aosta; became a monk, prior of Bec. 1063, and abbot, 1078; renowned for learning and practical wisdom; came to England, 1092; app. abp. of Canterbury by William II., 1093; had long quarrel with King over his investiture, which A. declared should be at hands of the Pope; a compromise effected, but dispute continued under Henry I. till 1109, when King made formal surrender. A. is famous as a scholastic theologian; his greatest work, *Cur Deus Homo*, profoundly influenced theology of the Atonement.

ANSGAR, ANSCHARIUS OR ANSGARIUS, ST. (801-65), 'The Apostle of the North,' was b. in Picardy and d. in Bremen. He went as a missionary first to Denmark, and then to Sweden. In 831 he was made archbishop of Hamburg, and the see was transferred to Bremen in 847. Among his works are some essays and a *Life of St. Willehardi*. See Rimbart, *Vita s. Anskarii*; Pertz, *Monumenta Germaniae Historica*, vol.

tl.; Tappenhorn, *Leben des Heil. Ansgar*. Munster, 1863.

ANSON, GEORGE ANSON, BARON (1697-1752), Brit. admiral; commanded voyage of circumnavigation (1740-44). and helped to reform navy; cr. Baron A. of Soberton (1747); story of his *Voyage Around the World* (1748) highly popular.

ANSONIA, CONN., a city in New Haven County, on the Nangatuck River, 12 miles northwest of New Haven, on the New York, New Haven & Hartford R. R. Nearly fifty industrial plants are located here, manufacturing clocks, electrical supplies, brass and copper goods, etc. About 4,000 workers are employed normally. Pop. 1920, 17,643.

ANSPACH or ANSBACH, a town of Bavaria, Germany, 24 miles southwest of Neurnburg, at the junction of the Holtzbach and Lower Rezat rivers. The town gives its name to an ancient principality or margravate, which was ruled by members of the House of Hohen-zollern. The town passed through various hands and in turn belonged to Prussia and France. In 1810 it was finally ceded to Bavaria. It has important industries. Pop. about 20,000.

ANSPACHER, LOUIS KAUFMAN (1879), an American playwright, b. in Cincinnati, Ohio, Mar. 1, 1879. After his graduation from the College of the City of New York, in 1897, he became secular lecturer for the Temple Emanuel, in New York City, later joining the lecture staff of the League for Political Education, also lecturing at the Brooklyn Institute of Arts and Sciences. His most popular play is *The Unchastened Woman*, which was produced in New York in 1915. Among his other well known productions are *Anne and the Arch Duke John*, *The New House*, 1921, and *Dagmar* (leading part played by Nazimova, adapted from the Hungarian, of Herzog, 1923.)

ANSTAY, F., pseudonym of Thomas Anstey Guthrie (1856), Eng. humorist; shows comic power of unusual kind in *Vice Versa* (1882), *The Brass Bottle* (both dramatized with great success), and other novels; *The Man from Blankley*, a play, and contributions to *Punch*.

ANT (*Formicidae*), family of hymenopterous insects resembling bees and wasps both in structure and in having highly evolved social habits which have excited the interest of observers from ancient times. The so-called *white ants* or termites (*q.v.*) belong to the entirely different order of Neuroptera. A's occur in three different forms, the queens or fertile females, smaller usually sterile

females or workers, and the short-lived males.

The whitish eggs laid by the queen develop into legless grubs (*larvæ*), which are fed by the workers and become chrysalids or pupæ, sometimes enveloped in silken cocoons. The workers continue to care for the helpless young for some time. After fertilizing, the queens during their nuptial flight, the males usually die, while the economy of the community is carried on by the workers and queens, special care being devoted to the building of nests for storing food and rearing the young. The complexity of their social life is illustrated by the division of labor, in the workers, who may be differentiated into 'soldiers,' 'nurses,' and other castes. Different species also exhibit a great variety of functions. Some (*e.g. Formica sanguinea*) are predacious, and invade the nests of other species, carrying home worker pupæ who are reared to become slaves. Others, like *Anergates*, have degenerated into being entirely dependent on their slaves. Many species have developed agricultural habits, cultivating certain fungi on specially prepared beds of finely-cut leaves, and harvesting the seeds of grasses which they store in 'granaries.' A's of pastoral habits tend other insects, known as ant-guests, in their nests, and in return receive nutrient secretions from them (*e.g.*), the honey-dew of Aphides (*q.v.*). Other guests seem to be kept as pets, emotions of joy and playfulness having been observed to be developed in some a. species. Some small species (*Solenopsis*) are thieves who steal the larvæ of other a's. Other peculiarities characterize the honey a's, whose workers forcibly inject honey into other workers with enormously distended abdomens, used as living honey-pots for the young brood. *Pseudomyrma* lives in the thorns of certain Central and S. American acacias, defending the trees against the destructive leaf-cutting a's (*Atta*).

ANTEUS (classical myth.), a Libyan giant, s. of Gea (the earth) and Poseidon (the sea). When his feet were planted on the earth he was invincible. Hercules, whom he challenged, divining the secret of his strength, lifted him in the air, and crushed him to death.

ANTANANARIVO (19° S.; 47° 45' E.), chief town, Madagascar; built on hill; palaces, mosque; two cathedrals; rebuilt since 1869. Pop. 63,115.

ANTARCTIC (66° 30' S. to Pole); South Polar region. See POLAR REGIONS.

ANTARCTICA, the region surrounding the South Pole, generally defined as bounded by the Antarctic Circle, but

admits of inclusion in a wider area, embracing that part of southern waters affected by Antarctic influences, and even the entire Antarctic Ocean. Within the Circle, Antarctica covers an area of some 8,200,000 square miles. It has been a frequent field of exploration with the aim of reaching the South Pole, the center of the region. Modern interest in Antarctica was stimulated by the expeditions undertaken by Captain Robert F. Scott, of Great Britain, and Captain Raoul Amundsen of Norway, between 1910 and 1912. Amundsen discovered the South Pole first, arriving there on Dec. 14, 1911. He took observations and finally placed it exactly at 90° S., where the Norwegian flag was flown and the land christened King Haakon VII. Plateau. Scott reached a point half a mile from this location on Jan. 18, 1912, and raised the Union Jack there. Other explorers identified with Antarctica discoveries include Sir Douglas Mawson and Sir Ernest Shackleton. The Antarctic region is a great waste of waters of ocean depth, which seem from soundings to indicate a gradual shoaling toward the Pole. At any rate, unlike the North Pole, the earth's southern extremity is marked by a great land mass bordered by ice cliffs, with towering glaciers and peaks approaching 11,000 feet in altitude. Climate conditions are severe and the thickness of the ice near the Pole has been estimated at some points at from 12 to 14 miles. One mass office, extending 400 miles from Ross Island to King Edward VII. Land, is known as the great Ice Barrier.

ANT EATER, name for mammals feeding on termites and ants. The great a. or ant bear (*Myrmecophaga jubata*) lives in humid savannas of tropical America, destroys termite nests with strong claws, seizing prey with long sticky tongue. The tamandua and little a. are smaller, arboreal species. The aardvark of S. Africa and a few other mammals are also termed a's.

ANTEDILUVIAN, character of period before Flood; hence epithet for that which is extremely antiquated.

ANTELOPES, ruminants with non-deciduous, hollow horns, differing from goats by the lack of a beard and longitudinal ridges on the horns, and by living, on the whole, in the plains. About 150 species are included, but the group does not permit of a precise definition, the classification of the white goat of N. America and the chamois being doubtful. The size varies between the pigmy a. (*A. pygmaea*) of Africa (8 in. high) and the eland (*Taurotragus*

oryx), which may stand up to 6 ft. in height and weigh about 1500 lbs. Most a's are natives of Africa (e.g.), the gazelles, the gnu, wildebeest, hartebeest, blesbok, oryx, and the bucks. The nilgal, the four-horned Indian chousingha, and the saiga are the best known Asiatic representatives.

ANTENOR (classical myth.), Trojan prince, famed for his wisdom, who advised the Trojans to restore Helen to Menelaus. A. afterwards migrated to Italy and founded the town of Padua.

ANTENNA, WIRELESS, the aeriels used in the operation of aerial telegraphic communication at land wireless stations or on vessels. These aeriels are wires, various in number and grade, strung up and down a tower, pole or mast, and connected with the receiving or transmitting apparatus in the instrument room, worked by the wireless telegraph operator. The use of antenna is conveyed by the original application of the word to the 'feelers' of insects, those flexible filaments, suggesting wires or hairs, attached to their heads and supposed to be organs of touch and even hearing. Without the aid of antenna or aeriels, wireless telegraphy could not be conducted and to that extent this remarkable means of communication cannot be said to be strictly wireless. The antenna at the top of a tower, pole or mast picks up messages on the air sent from another wireless installation by electrical actuation of sound waves and conveys it along its wires down to the instrument room. vice versa, when an operator desires to transmit a message through space, his operation of devices at hand charges the wires and the words are despatched to their destination from the apex of the structure that supports the wiring equipment. When a number of parallel aerial wires or antenna are employed, the object is to obtain an increased capacity wherein to store electrical energy to be radiated as electrical waves, the vertical wires being defined as virtually one plate of a condenser, the earth the other plate, and the air the insulating medium. The wires used are of iron, copper or aluminum, and are insulated.

ANTEQUERA, a tn. in Malaga prov.; Spain, on l. b. of the Guadalquivir. Held by the Moors from A.D. 712-1410, and has left a Moorish castle and walls. Trade in oil and fruit, and some manufacture of silks, leather, etc. Pop. 25,000.

ANTHEM (A.S. *antefen*, antiphon); hymn or arrangement of Scripture sung as part music.

ANTHOLOGY, title derived from a

ANTHON, CHARLES

Gk. word, meaning a garland, or collection of flowers, and applied generally to a choice collection of poetry. The most famous collection of the kind is the Gk. Anthology. The earliest version was that compiled by Meleager of Gadara (80 B.C.), which included poems by himself and some forty earlier poets. Additions were made by later editors, the most complete and best selected collection being that compiled by Constantinus Cephalas, a X.-cent. grammarian. The MS. of this collection was discovered in the Heidelberg Library (1606), and was first pub. in Brunck's *Analecta Veterum Poetarum Graecorum* (1772-76). Amongst Eng. a's the best-known are F. T. Palgrave's *Golden Treasury* (1st and 2nd Series); Sir A. T. Quiller-Couch's *Golden Pomp*, and *The Oxford Book of English Verse*; H. C. O'Neill's *Pure Gold*; Canon Beeching's *Lyra Sacra*, and *A Paradise of English Poetry*; Watson's *Lyric Lore*; Henley's *Lyra Heroica*; and Massfield's *A Sailor's Garland*.

ANTHON, CHARLES, LL.D. (1797-1867), American classical scholar, was b. in New York. He was called to the bar in 1819, appointed adjunct professor of anct. languages in Columbia College in 1820, and principal professor in 1835. He ed. Lempriere's *Classical Dictionary* in 1841 and compiled a *Dictionary of Greek and Roman Antiquities* in 1843.

ANTHONY, ALFRED WILLIAMS (1860), an American Baptist clergyman, b. in Providence, R. I. Graduating from Brown University and the Cobb Divinity School, he studied two years further in Berlin, Germany, then returned to become pastor of the Essex St. Church, in Bangor, Me., in 1885. In 1890 he became professor of New Testament Exegesis in the Cobb Divinity School, where he remained till 1908, when he became professor of Christian literature and ethics at Bates College. From 1911 he was corresponding secretary of the General Conference of Free Baptists. He wrote *An Introduction to the Life of Jesus*, 1896; *New Wine Skins*, 1901, and *The Conscience and Concessions*, 1918.

ANTHONY, DANIEL READ, JR. (1870), Am. congressman, b. at Leavenworth, Kans., Aug. 22, 1870. Graduating from the University of Michigan, in 1891, he took up newspaper work on his father's paper, *The Leavenworth Times*, of which paper he became editor and manager on the death of his father, in 1904. In 1903 he was elected Mayor of Leavenworth for a term of two years. In 1907 he was elected to fill a vacancy in Congress. Two years later he was re-elected, from the First District of Kansas, serving until 1921.

ANTHRACITE

ANTHONY, ST., ANTONY (251-356), founder of Monachism; b. Koma, Upper Egypt; said to have lived many years in lonely ruin of Thebaid, suffered strange temptations which have been favorite literary subject, and performed miracles related by Athanasius.

ANTHONY, SUSAN BROWNELL (1820-1906), American reformer, b. at Adams, Mass., of Quaker parents, and taught in a New York school from 1835-50. She was a zealous agitator for total abstinence and the abolition of slavery, and, after the civil war of 1861-5, for woman suffrage. In 1863 she founded the *Revolution*, and was one of the authors of a *History of Woman Suffrage*, 1881-7.

ANTHOZOA, ACTINOZOA, class of Coelentera, represented by sea-anemones and coral-forming polyps, with tentacles often provided with stinging cells round the mouth, a well-developed gullet, and vertical radially arranged ridges or mesenteries on the interior of the body walls. They reproduce sexually, and chiefly by budding. Both individuals and colonies are some of the most beautiful denizens of the sea. The a. are divided into two subclasses. The *Zoantharia* have tentacles and mesenteries, some multiple of six, the limy skeleton, if any, grows from the base, and they are either simple or colonial, and include the sea-anemones (*Actinaria*), the reef-corals (*Madreporaria*); and the 'black' corals (*Antipatharia*). The *Alcyonaria* have eight feathered tentacles and eight mesenteries, and diversely shaped calcareous spicules forming corals (e.g.), Dead-Men's-Fingers (*Alcyonium*), Sea-Pen (*Pennatula*), Red coral (*Corallium*), Organ-Pipe coral (*Tubipora*), etc.

ANTHRACITE, or stone coal, a particularly hard and lustrous variety of coal, slow in ignition, but giving out an intense heat with little effusion of smoke. It is used for drying hops and malt, in blast furnaces where a high temperature is required, and for steam navigation purposes, particularly in warships, where its smokeless quality makes it especially valuable. It has been suggested that a. has been produced from vegetable matter that has been more completely macerated and deprived of its putrescible constituents before submergence than that producing ordinary bituminous coal, or that the submergence took place in shallow water where the plant substance was exposed to the oxidizing influence of the air, thus minimizing the amount of hydrogen and carbon compounds. Most a.s. contain 90 per cent. of carbon, whilst

bituminous and gas coal contain from 75 to 80 per cent. of carbon, the remainder being made up of hydrogen, oxygen, and nitrogen together with varying amounts of ash.

A. is found in large quantities in Pennsylvania and in S. Wales, where more than half of the supply is exported for use on steamers in all parts of the world.

ANTHRAX, a virulent infectious disease, occurring more usually in cattle, sheep, horses, and other herbivora, but communicable by them to man. It affects animals in all parts of the world and particularly in marshy districts, usually through contaminated fodder or water, or by the infection of a surface wound. An attack is often very sudden, an animal falling down in convulsions, or there may be at first fever and bleeding at the mouth, etc. The public health authorities have very stringent regulations regarding the disposal of the bodies of infected animals.

The men usually infected are such people as wool-sorters, farm hands, and groomers, and the disease may be either external or internal. In the former a vesicle forms on the surface, which becomes pustular, and the danger is that the disease may become generalized. To prevent this, the affected area should be completely excized, and pure carbolic acid applied to the surface. In the internal form, in which infection usually causes virulent pneumonia, the anti-anthrax serum which has been introduced should be tried, and the person's strength kept up, but recovery is rather rare.

ANTHROPOID APES (*Simiidae*), zoological family including the gibbon, gorilla, orang, and chimpanzee, resembling man in many ways.

ANTHROPOLOGY, the science of man, is, necessarily, of an extremely complex nature and difficult to define. It comprises the comparative anatomy of human races (physical anthropology), the study of their functions (ethnology) and their history, while anthropogeography treats of their distribution. The earliest history of man (archæology) merges into palæontology on one side and folk-lore and modern history on the other. The comparative study of the functions (physiology and psychology) of human races includes that of speech (philology), of craft (technology), of art (æsthetics), of conduct (ethics), and of religion (theol.). The study of social customs (sociology) links folk-lore, economics, and politics. Anthropology in the popular sense—i.e., physical anthropology—has for its

aim the elucidation of the relationship between the races of mankind and their forbears, and to define the term 'race' itself. Its methods are observational or statistical. The former deals with characters such as stature and pigmentation, and includes the study of the relative shapes of skulls (craniometry). Concerning this branch of anthropology, an interesting problem has been raised by the observation that there is a tendency of the skulls of immigrants to become in the course of a few generations like the native skull type, the example being the approximation of the skulls of Anglo-Saxon, Scandinavian, Italian, and other racial representatives to the native type in N. America. The statistical method of treating anthropological problems is included in biometrics, and mainly consists of collecting an adequate number of measurements of certain individual characters—(e.g.), stature, cephalic index, fertility—to be able to arrive at a general formula for the occurrence of the character of a population.

ANTHROPOMETRY, 'the practical side of anthropology'; the system of measurement of certain parts of the human body for comparison in affording indications of race; also used for recording individual identities by criminologists. The usual anthropometric measurements are those of cranial capacity, facial index, dimensions of the pelvis, femur, and scapula, height, and hair section.

ANTHROPOMORPHISM, the ascription to the Deity of qualities which properly belong to human beings; or, more generally, a tendency to represent all things under conceptions derived from man's personal experience. Anthropomorphism is most prominently exemplified in religious thought; it is impossible for the religious mind to formulate the relations between God and man except by attributing to Him a nature akin to our own.

ANTI AIRCRAFT GUNNERY. The problem of attacking flying machines by gun-fire from the ground exercised ingenuity of most alert scientific minds during the World War. Owing to the complexity of the conditions, many of its problems are as yet unsolved. As modern aeroplanes possess extreme speed and power of manœuvre, they can avoid shells by a slight change of direction—(e.g.), if a shell requires 30 seconds to get from gun to target, aeroplane flying at 120 m. has to travel a mile to meet it; by turning completely on its track it can avoid the shell by nearly 2 m. This 'dodging' or 'jinking' of the aeroplane

is the dominating factor in the problem, and explains the relatively small losses inflicted on aircraft by gun-fire from the ground (est. at 7 per cent. of the whole). Role of anti-aircraft gunnery is, however, a preventive one: it forces aircraft to fly high and interferes greatly with bombing, reconnaissance, photography, and artillery observation. Anti-aircraft guns, capable of attacking the enemy suddenly and unexpectedly at ranges of 8,000 or 9,000 yds., provide the moral deterrent to all these forms of activity. Surprise is the essential of success both for aircraft and gun. The aeroplane appears often not more than a minute, carries out its business, and is gone; in the first half-minute the gunner has to make all his measurements of height, speed, and direction, determine the right fuse-setting, set the fuses, load, aim, and discharge his gun. Complicated calculations are, therefore, out of the question, and the instruments employed must be as simple and automatic as possible. The problem is all the more difficult because the range-error is often impossible to determine and, always useless when determined, because it refers to the past. Much ingenuity has been expended in devising means of predicting the future position of the target by the use of instruments measuring the elements of its present position (speed and course). During the war long-base range finders (500 to 3,000 yds. apart), working with telephonic or electrical communication, were generally used, but were inferior to the most recently designed monostatic optical instrument. The range being obtained, it was necessary to determine either the course and speed, or the angular velocities of the target about two axes at right angles, in order to predict the point at which to aim the gun. This required complicated instruments and highly trained observers. Fuse-setting was determined graphically by a 'height-fuse indicator,' employing the height, angle of sight, and vertical deflection as data. Finally, if the highest accuracy was required, corrections had to be superimposed for effect of wind on shell, effect of density of air, wear of gun, and temperature of charge, on the trajectory, 'drift' to the right caused by the rotation of the shell and abnormal burning of the fuse. In practice the processes were carried out in rather a rudimentary fashion, owing to the extremely important tactical advantage of engaging the enemy without delay. Guns mostly employed in anti-aircraft work were of about 3-in. calibre, firing 12½ or 16 lb. shells. The French 75 mm. 'auto-cannon' was most effective. Brit. worked largely with improvised mount-

ings till the end of the war, the chief gun ('archie') employed being the 13-pr. (9 cwt.) mounted on a lorry. The 3-in. (20 cwt.) gun, specially designed for anti-aircraft work, was also largely employed, but gave much trouble with fuses and shells and was not as mobile as the 13-pr. One of the main difficulties of anti-aircraft work was the bad behavior of fuses, a variety of conditions (now well understood), causing large errors and many 'blinds.' Investigation of these and other problems—(e.g.), effect of wind and atmospheric density, the dynamics of shell flight, laws of resistance of the air—has had a remarkable scientific reaction on development of ordinary gunnery.

ANTICHRIST, the conception of 'Antichrist' is that of a great enemy of God who will rise to power at the end of time. For the origin of this idea we must go back to the mythology of ancient Babylonia and Iran. Iranian religion was dualistic, i.e., there was always a conflict between the power of good and the power of evil. This became involved with the Babylonian myth of the struggle of the Supreme God with a primeval water-dragon. These conceptions, like other myths, came to be applied to historic persons, so Antiochus Epiphanes in the Book of *Daniel* (II. cent. B.C.) becomes the type of an enemy of God, called in Christian theol. whence the term is taken over, 'Antichrist' (see in New Testament, *1 John*; cf. the 'man of sin,' *2 Thessalonians* 2); and the reappearance of the dragon myth in *Revelation* 12). A. has been identified with Nero, Simon Magus, by Protestants with the Pope, and by Catholics with heresiarch. It gave birth to a considerable Christian lit.

ANTICLIMAX, term of rhetoric for weak culmination of literary crescendo. Well-known example, Pope's 'And thou Dalhousie, the great God of War,

Lieutenant-Colonel to the Earl of Mar,' shows literary effect of intentional use.

ANTICOSTI (49° 27' N., 63° 5' W.), island, Quebec, Canada. Pop. 250; now a game-preserved owned by M. Menier, the chocolate maker.

ANTICYCLONE, an atmospheric pressure system in which the pressure diminishes from the center. In N. hemisphere air moves, in a system, clockwise spirally outwards, in S. hemisphere counter-clockwise.

ANTIETAM (39° 40' N., 77° 38' W.), river, Maryland; joins Potomac near Sharpsburg, where Federalists under M'Clellan defeated Confederates under Lee, 1862.

ANTI-FEDERALISTS

ANTI-FEDERALISTS, the forerunners of the present Democratic party, and the first political group formed in the United States after the revolution. The party dominated the country under the triumphant leadership of Jefferson (*q.v.*), in the elections of 1800. As its name implies, the anti-Federalists opposed the so-called Federalists, who, represented by the superior classes, commerce and capital, favored a unified system of government, as established at present, rather than the decentralized form advocated by their opponents. The anti-Federalists contended that the federalism contemplated meant a disguised oligarchy and restraints on the liberties of states and on popular government. In the early political conflicts between these opposing forces, however, the Federalists won, securing the adoption of the national Constitution as then framed, but suffered in popular esteem by the policy they pursued in office notably in the passage of the Alien and Sedition acts, which were deemed to bear out the anti-Federalists' claim that the Federalists encroached on state jurisdiction and individual liberties. The victory of the anti-Federalists under Jefferson followed. The party underwent a change of attitude on taking office, discarding its original creed, which aimed at restricting the powers of the national government. The Federalists never recovered from their defeat and their basic principles were adopted by the anti-Federalists. The latter's objection to the constitution were removed by subsequent amendments, whose adoption they effected. They became known as the Republican party, then Democratic-Republican and later grew into the Democratic party as it exists today.

ANTIGO, county seat of Langlade County, Wis., 100 miles northwest of Oshkosh, on the Spring Brook River and on the Chicago & Northwestern R. R. It is the center of a productive agricultural region, which it serves as a shipping point. Forest products are also shipped in large quantities. There are a few manufacturing, largely lumber and wood finishing mills, and several railroad machine shops. Pop. 1920, 8,451.

ANTIGONE (classical myth.), dau. of Oedipus and Jocasta; a devoted dau., she guided her blind *f.* in his wanderings; tragedy by Sophocles.

ANTIGONUS. (1) Macedonian general of Alexander the Great, and king, known as Cyclops (one-eyed); aimed at sovereignty of Asia; slain at Ipsus (301 B.C.) by coalition of satraps. (2) Gonatas, grandson of above, King of

ANTIMONY

Macedon (283 B.C.); driven out but recovered kingdom. (3) Doson, usurper kingdom of Macedonia; conquered Sparta (d. 220 B.C.). (4) King of Judea, last of Maccabees to reign. Killed by Mark Antony (37 B.C.).

ANTIGUA (17° 12' N., 61° 53' W.); one of Leeward Islands, Brit. W. Indies, discovered by Columbus, 1493; chief product, sugar; capital, St. John. Area, 108 sq. miles. Pop. 32,500.

ANTIOCHUS, youngest of the Gr. heroes in the Trojan War, *s.* of Nestor and friend of Achilles; slain while trying to save the life of his father.

ANTILES (14° N., 60° W.), W. Indies (*q.v.*); Northern Islands form Greater A., the Eastern (Leewards and Windwards) the Lesser A.

ANTIMACHUS (*fl.* 400 B.C.), Gr. epic and elegiac poet. When his *Thebais* was publicly recited all the audience left but Plato. Hadrian preferred his *Lyde* to the Homeric poems.

ANTI-MASONIC PARTY. Popular hostility to Freemasonry figured as a disturbing factor in American political elections in the early part of the 19th century. It had its origin in the abduction and disappearance of a decayed Virginian, William Morgan by name, a mason by trade and a supposed member of the fraternity, who, settling in Batavia, N. Y., about 1824, was suspected of writing a book exposing the secrets of Freemasonry. Morgan was spirited away and never seen again and his book, later published, placed Freemasonry in a sinister light. Men suspected of abducting Morgan were tried between 1827 and 1830 and convicted, but could not be held for murder. Popular opinion blamed the fraternity for the crime and manifested its hostility in an anti-Masonic party which was formed. The party vetoed the candidature for public office, local, state or national, of any citizen who was a Mason. In fact, starting from New York, the movement forced numerous lodges to dissolve all over the country. The charters of more than 3,000 were surrendered before the agitation abated. In 1828 the National Republicans did not have to nominate anyone who belonged to the order. The political fortunes of William H. Seward, Millard Fillmore, Thurlow Weed, Henry Clay and William Wirt were involved in the Masonry issue of their day. The anti-Masons survived till 1840.

ANTIMONY (Sb = 120.2), bluish white, lustrous, brittle, crystalline, metallic element; m.p. 630° b.p. c. 1800°.

It occurs in the pure state in Borneo, Sweden, and Dauphiné, but chiefly in China, as stibnite (Sb₂S₃), from which it is smelted. Antimony having the property of expanding when solidifying and imparting this characteristic to its alloys, is used extensively for sharp castings, especially type metal, which consists of antimony, lead, and tin. An alloy of antimony, tin, and a small quantity of copper is called *Britannia metal*. Antimony alloyed with lead extensively used for shrapnel bullets. Antimony acts as a severe poison similar to arsenic. Its compounds, especially tartar emetic (potassium antimonyl tartrate), are occasionally used medicinally. Red antimony sulphide is used in vulcanizing rubber and on safety matches; the tetroxide to render enamels opaque.

ANTIN, MARY (MARY ANTIN GRABAU) (1881), a Russian-American, author, b. in Polotzk, Russia. She came to this country at the age of thirteen, was educated in public schools and the Girls Latin School, of Boston, Mass. Later she studied at Teachers' College (Columbia University), but before taking her degree married Prof. Amadeus W. Grabau, of Columbia University. She is the author of *From Polotzk to Boston*, 1899; *The Promised Land*, 1912, and *They Who Knock at Our Gates*, 1914.

ANTI-NARCOTIC ACT, a measure which became a law on March 26, 1922, amending the Anti-Narcotic Act previously passed by Congress. The law established a Federal Narcotic Board, composed of the heads of the State, Treasury, and Commerce departments, which was empowered to authorize the importation of crude opium and cocoa leaves which might be found necessary for medical and other legitimate purposes. Any alien convicted of violating the Act is liable to deportation, while for others a fine of \$5000 or ten years in prison was provided.

ANTINOMIANS (Gk. 'against law'), those who laid emphasis on faith, rather than on the moral law; especially so called by Luther.

ANTIOCH. (1) City, Syria (mod. *Antakieh*) (36° 10' N., 36° 8' E.), founded 300 B.C.; on main route into Asia, hence early became center of wealth and luxury; cap. of Seleucid kings; greatly favored by Pompey, Caesar, Augustus, and Trajan; name 'Christians' first given to converts in Antioch. Destroyed by Persians (538), rebuilt by Justinian; cap. of crusading principality (1097-1268). Modern city occupies only part of great circuit of anc. walls; silk manufactures; damaged by earthquake (1872). Pop. 26,000

(one-tenth of former pop.). (2) **ANTIOCH** in *PISIDIA*, anc. tn., Asia Minor (c. 38° 19' N., 31° 8' E.), 200 m. E. of Smyrna, Of Gr. origin; later Roman colony. Paul and Barnabas preached here (Acts 13 and 14). Now only a few ruins.

ANTIOCHUS, name of thirteen kings of Syria (Seleucid dynasty). (1) I. (r. 280-264 B.C.), known as 'Soter' for repelling invasion of Gauls. (2) II. (d. 246 B.C.), liberated Milesians from a tyrant; poisoned by divorced wife. (3) III., **THE GREAT** (r. 223-187 B.C.), conquered Palestine and Coele-Syria; harbored Hannibal; involved in war with Romans; defeated at Thermopylae (191 B.C.) and at Magnesia (190); compelled to yield all territory W. of Mt. Taurus and pay heavy tribute; murdered by people for his extortions. (4) **ANTIOCHUS EPIPHANES**, son of above (King of Syria 175-164 B.C.); conquered large part of Egypt; twice took Jerusalem; bitterly oppressed Jews; when revolt of Mattathias and Maccabees proved successful, went mad. Died at Tabæ, Persia 164 B.C.

ANTIPAROS (anc. *Oliaros*) is an is. of the Cyclades group in the *Ægean* Sea, separated from Paros by a Jannigerous channel. It produces wine and cotton; but is chiefly celebrated for its wonderful grotto, 120 yds. long, 113 yds. wide, and 60 feet high, from the roof of which depend large stalactites. The floor is rough and uneven, and set with various colored crystals and stalagmites. Pop. 500.

ANTIPATER, a general of Alexander the Great and regent of Macedonia during Alexander's expedition to the East (324-323 B.C.). Suppressed Thrace and Sparta. On Alexander's death he was left in command in Macedonia, and in the Lamian war he crushed the Gks., who had attempted to reassert their independence. He became sole regent in 321 B.C. and died in 319 B.C.

ANTIPATER, LUCIUS CÆLIUS (A. 150 B.C.), one of the most anc. of Rom. historians, was also an orator and lawyer. He was a contemporary of the Gracchi and wrote a famous history of the second Punic war. See MELTZER, Dr L. CÆLII ANTIPATRO, 1867; W. S. TEUFFEL, *GESCHICHTE DER RÖMISCHEN LITERATUR*, 1870.

ANTIPHON, a composition for singing alternately, a verse to be sung before or after the Psalms in liturgical services of R.C. Church.

ANTIPODES (literally, with the feet opposite), those who live on the opposite side of the globe, and also the country of their habitation.

ANTIPODES ISLANDS (49° 30' S., 178° 30' E.), islands, New Zealand. Uninhabited.

ANTIPOPE, prelates who were not canonically elected popes, but, in spite of the fact that there existed a lawfully elected pope, claimed and to some extent received papal privileges. Hergenrother gives the names of twenty-nine *a's*, but he omits the names of Benedict XIII. and John XXIII. Corrected in this way, his list reads: Hippolytus, III. cent.; Novatian, 251; Felix II., 355-65; Ursicinus, 366-67; Eulalius, 418-19; Laurentius, 498-501; Constantine II., 767; Philip, VIII. cent.; Anastasius, 855; Leo VIII., 956-63; Boniface VII., 974; John XVI., X. cent.; Gregory, 1012; Sylvester III., 1044; Benedict X., 1058; Honorius II., 1061-72; Clement III., 1080-1100; Theodoric, 1100; Aleric, 1102; Maginulf, 1105; Gregory VIII., 1118; Anacletus II., 1130-38; Victor IV., 1159-64; Pascal III., 1164-68; Calixtus III., 1168-77; Innocent III., 1178-80; Nicholas V., 1328-30; Clement VII., 1378-94; Benedict XIII., 1394-1423; John, 1410-17; Felix V., 1439-49.

ANTIPYRINE, PHENAZONE (C₁₁H₁₂N₂O), a white, crystalline, bitter, inodorous substance used in medicine for lowering the temperature in fever, and for relieving pain, (*e.g.*) of headache; other drugs are now more commonly used, because of its depressant action on heart.

ANTIQUARY, a person devoted to the study of archaeology and its kindred subjects. The Eng. Society of Antiquaries was formally constituted in 1717; the Scot. Society of Antiquaries in 1780; the Irish Society in 1890, though under other names it flourished much earlier; the Amer. Society (at Worcester, Mass.) in 1812.

ANTI-SALOON LEAGUE, an organization established in 1895 by the combination of smaller leagues of five States. It is a National federation of organizations, and its original purpose was the extermination of the traffic in alcoholic liquors. The League had the aggressive support of most of the large church organizations of the country, and the work was carried on so effectively and intelligently that prohibition of liquor was widely extended in the States. The League began with the fight for local option and these were gradually won, until it was enabled to launch a State-wide campaign. In 1907, Oklahoma voted for prohibition; in 1908, Georgia; in 1909, North Carolina, Missouri and Tennessee. These were followed by 15 states, chiefly in the Southwest, which provided for entire prohibition of the

traffic up to the time of the passage of the Constitutional Amendment in 1918. The three great divisions of the work of the League were agitation, or field work, legislation, and law enforcement. The avowed purpose of the League was the enactment of the Constitutional Amendment for the prohibition of the liquor traffic, and to this, from 1916, it devoted its chief energies. So great was the influence and so intelligent its method of operation, that the amendment was carried in Congress by a large majority and was ratified by all the States except three. See LIQUOR TRAFFIC.

After the amendment had gone into effect, the League devoted its special efforts to combat modification of the State laws against the liquor traffic, and to the strict enforcement of these laws.

ANTI-SEMITISM, the name given to a widespread political movement, which was directed against the Jews during the last twenty years of the 19th cent. and earlier years of the 20th cent. The hostile movement began in Germany and Austria, in both of which countries the Heb. element was strong. The Jews, moreover, had succeeded in assimilating the Ger. national spirit in a very remarkable degree; and, besides having secured the control of a large share of the state's commerce, individual members of the Jewish body had achieved high positions in literature, music and other arts (*e.g.*) Heinrich Heine, Karl Marx, Ludwig Borne, and Ferdinand Lasalle; the composers Mendelssohn and Meyerbeer; and the politicians Edward Lasker and Ludwig Bamberger. So powerful had the Semitic influence become in political life that Prince Bismarck found it a serious menace to his schemes, and there gradually arose a strong anti-Semitic feeling, which is said to have been engineered by the prince himself, and was fomented by a court preacher named Adolf Stocker. The spark appeared in the year 1879, and was quickly fanned into flame. Quarrels were fixed upon members of the Jewish race; they were insulted and boycotted; attempts were made to exclude them from the schools and univs.; duels between anti-Semites and Jews were of frequent occurrence; and street riots were by no means uncommon. This abominable persecution, however, did not meet with general acceptance, and, amongst others, the crown prince Frederick publicly denounced the agitation as a standing disgrace to Germany.

Scarcely had the excitement aroused by this outbreak subsided when a much more serious one took place in Russia. This was in 1881. As in Germany, an antagonistic feeling against the Jews was

stirred by secret means, and the reign of persecution began. The Russian Jews were cooped up in huge ghettos, chiefly in the Polish areas; and when the work of massacre and burning commenced, it quickly spread throughout Western Russia. It is estimated that nearly two hundred towns and villages were concerned in the outbreak, including Warsaw, Odessa, and Kiev; immense numbers of men, women, and children met with violent deaths, and many thousands of unoffending people were ruined. Though public indignation was raised to the highest pitch, little notice was taken of any protest, and similar outbreaks (*pogroms*) occurred in 1890-1, and also within recent times. Almost concurrently with these earlier outbreaks in Germany and Russia, there arose violent persecutions in Rumania and Austria-Hungary, while Fr. anti-Semitic feeling reached its climax in the conspiracy by means of which a Fr. Jewish officer, Captain Alfred Dreyfus, was, in 1894, convicted of treason.

Efforts to create anti-Semitic feeling have from time to time been made in America, but with little success.

ANTISEPTICS, substances which destroy or prevent or arrest growth of bacteria, thus preventing putrefaction or fermentation of wounds, etc. Antiseptic surgery, introduced by Lord LISTER, who killed contaminating organisms by swabbing wounds with carbolic acid, wrought marvelous improvement, and laid foundation of manifold subsequent developments, which involve destruction of all putrefactive and pathogenic organisms on the surgeon's hands, instruments, and dressings (sterilization), as well as those which gain access to the wound from other sources; ideal antiseptic not yet discovered; some modern surgeons avoid antiseptics altogether, and rely upon recuperative and protective powers of the tissues reinforced by weak solutions of salt.

ANTI-SLAVERY MOVEMENT. See **SLAVERY**.

ANTITHESIS, term of rhetoric for contrast; example: 'He had a head which statuary loved to copy, and a foot the deformity of which the beggars in the street mimicked' (Macaulay, *Essays*).

ANTITOXINS. Many diseases are believed to be caused by the formation in the blood of poisonous bodies known as toxins. In the course of the disease, in order to counteract the effect of these poisons, the body produces certain substances to which the name 'antitoxins' has been given. Not only do they check the course of the disease, but they render the sufferer immune against subsequent

attacks. In order to produce artificial immunity, or to assist the sufferer in fighting a disease, antitoxins are prepared and injected into the blood. Their method of preparation consists in first making in broth a culture of the bacillus which produces the disease. In this way, the toxin, or poison, is produced. The bacilli are then killed by an antiseptic and removed from the broth by filtration. The filtrate consists of a solution of the toxins, and a small quantity is injected into the blood of a healthy horse. At certain intervals further quantities are injected, in doses of increasing strength. The body of the horse combats the effect of the toxin by the formation of anti-toxins, and as soon as the animal is found, by test, to be immune from the disease, a quantity of blood is drawn from its veins. The serum is produced from the horse's blood by separation of the corpuscles, and then treated with a preservative and measured into doses. By injecting this serum into the blood of human beings, their resistance to attack, or their power of fighting the particular disease is greatly increased. Much success has attended this method of treatment in fighting diphtheria and, to a lesser degree, pneumonia, tuberculosis, yellow fever, bubonic plague, cholera, tetanus and meningitis. An antitoxin for treating hay fever has met with only partial success, and attempts to treat scarlet fever, rheumatism, dysentery and anthrax have failed.

ANTI-TRADES. Steady winds blowing in the upper air in a contrary direction to the trade winds blowing at the earth's surface. Thus in the northern hemisphere they blow from the S.W. and in the southern from the N.W. Their direction has been demonstrated by the dispersion of matter ejected from volcanoes.

ANTIVARI (42° 5' N., 19° 9' E.), port Jugo-Slavia. Pop. c. 2500.

ANTLERS, outgrowths of the frontal bones occurring in deer under many forms; may be functionally compared with HORNS, but have quite a different structure; while growing, covered with vascular, hairy skin ('velvet'); this dries up, is rubbed off, and leaves bare and insensitive bone as powerful weapon of offence and defence. Antlers not attached directly to bone, but to stalk or pedicle. Except in reindeer, antlers borne only by male. Shed late in season; renewed in following spring.

ANTOFAGASTA.—(1) (23° 38' S., 70° 24' W.) capital of (2). Pop. 51,530. (2) province, Chile. Area, 46,597 sq. miles. Pop. 172,330.

ANTOINETTE**ANTOINETTE** see **MARIE ANTOINETTE**.**ANTOMARCHI, FRANCESCO** (1780-1838), Ital. physician; entered service of Napoleon at St. Helena 1818, and after his death published famous, but untrustworthy, *Derniers Moments de Napoleon* (1823); genuineness of his representation of cast of Napoleon's head much questioned.**ANTONELLI, GIACOMO** (1806-76), Ital. cardinal (cr. 1847); had considerable influence over Pius IX. on anti-liberal and anti-national side; thought by some unscrupulous in finance and diplomacy.**ANTONINUS PIUS** (86-161 A.D.), Rom. emperor; b. near Lanuvium; adopted s. of Hadrian, whom he suc. (138); comparatively peaceful reign; simple and just ruler; adopted Marcus Aurelius (q.v.) **WALL OF ANTONINUS**, Roman wall, built by Emperor Antoninus Pius, and stretching from the Firth of Forth to the F. of Clyde, in Scotland, distance about 40 miles. It was erected in year 140 A.D., as protection against invasion from north.**ANTONIUS MARCUS** (143-87 B.C.), a distinguished orator and prominent citizen; was one of the many eminent citizens of ancient Rome of the gens Antonia, named A.**ANTONIUS MARCUS**, **MARKE ANTONY** (c. 83-30 B.C.), grandson of the above, was second only in influence and power during Caesar's dictatorship, and triumvir after his death, taking eastern half of Empire. His infatuation for Cleopatra ultimately caused senate to deprive him of his powers (32). He was defeated at *Actium* (31) and committed suicide (30 B.C.)**ANTONY, ST.**, of Padua (1195-1231), originally an Augustinian monk transferred to the Franciscan order, was a great preacher and worker of miracles, and emphasized the necessity for austerity in his order; canonized by Pope Gregory (1232).**ANTRIM** (54° 50' N.; 6° 10' W.), county, N.E. Ireland; land area, 711,275 acres; capital, ANTRIM, largest town, Belfast; has Lough Neagh in S.; Giant's causeway on N. Atlantic coast, remarkable basaltic cliffs; much of surface covered with volcanic rocks; bogs in S.W., hilly in N. and E. Chief rivers, Bann, Lagan. Produces flax, cereals; minerals include iron, rock salt, alum, clay. Industries include linen and cotton manufactures, fisheries, paper-making, distilling. Climate temperate. Pop. 1911, 478,603. Town, 1800.**AN-TUNG** (40° N.; 124° 30' E.),**ANTWERP**

port, Manchuria, China. Pop. c. 58,000.

ANUS, the external termination of the rectum, or opening of the lower end of the alimentary tract. The aperture is closed, except during the act of defecation, by the external and internal sphincter muscles. A congenital closure of the rectum by an imperforate A. is sometimes met with in infants, but can usually be remedied by a simple surgical operation. Other affections of the part are spasm of the sphincter muscle, ulceration or fissure of the A., a pruritus ani, characterized by intense irritation. The usual treatment consists of strict attention to cleanliness and the use of suitable ointment.**ANTWERP**. (1) Prov., Belgium; surface level; grain, flax. Area, 1,093 sq. m.; pop. 1,000,000. (2) Fort. city, seapt., and cap. of above (51° 14' N., 4° 25' E.); commercial metropolis of Belgium. On Scheldt; excellent harbor; extensive quays; ten dry docks. Chief industries: shipbuilding, sugar, textiles, lace, petroleum, tobacco, distilling, diamond-cutting; exports: glass, coal, chemicals, iron, steel, cotton drugs; birthplace of RUBENS; has fine Gothic cathedral (with Rubens' *Descent from the Cross*), museums, etc. After Treaty of Westphalia (1648), closing of Scheldt ruined Antwerp's trade, but since its reopening in 1863 town has regained commercial importance. Fortified by Brialmont (1861-70) as main military bulwark of Belgium, to which army could withdraw in last resort; new rampart 1 m. out from old works; 2 m. further out circle of detached forts (27 m. in circuit), connected by railway and strengthened by system of inundations, thus making Antwerp strongest fortress in Europe. Frequently besieged, plundered, and taken by various powers. Olympic games were held Aug. 1920. Pop. 333,882.*Siege of Antwerp* (1914).—On Aug. 19, 1914, the Belgian army, about 100,000 strong, retreated within the fortified lines of Antwerp, the Germans leaving a corps of observation to watch the position while their main force was directed against the Allies on the French frontier. The Belgians made sorties in order to compel the enemy to detach large reserves to ward off a standing menace to the safety of his communications. At the end of September the Germans determined to reduce the fortress. Von Beseler, an artillery expert, was put in command. Heavy howitzers were brought to bear on the southeastern forts on the S. bank of the riv. Nethe, while attacks were made on the line of the Scheldt, W. of Antwerp, about Termonde, in order to cut off the retreat of the garrison. The bombard-

ment began on Sept. 28; on the 29th Fort Wavre Ste. Catherine was destroyed; next day Fort Waelhem was nearly silenced, and the Belgian trenches were flooded by the bursting of the reservoir N. of the Nethe. On Oct. 1, Forts Waelhem, Konigshoykt, and Lierre were reduced, and the Belgians retired to an improvised line of defence N. of the river. On Oct. 2 it was decided that the breach of 9 m. in the main works made resistance hopeless, and that the army should prepare to effect its escape. The civilian evacuation had already begun. At this juncture Mr. Winston Churchill, then first lord of the Admiralty, arrived from Ostend, and persuaded the Belgian staff to prolong the defence. On the evening of the 3rd and the following day a brigade of Brit. marines and two brigades of the untrained Royal Naval Division came, and were rushed to the trenches; but on the 5th the Germans occupied Lierre, and so forced the British and Belgians back to the line of the old forts close in to the city. On the 6th von Beseler demanded complete surrender, threatening to bombard the place. The summons was refused, and the process of evacuation hastened. The line of retreat across the Scheldt was now closely threatened, and with the bombardment of the city, beginning at midnight, confusion and panic reigned within. Civilians fled by the roads to Holland, and by the overcrowded steamers and other craft in the river. A floating bridge was thrown across the Scheldt by which, as also by road and rail, the Allied troops made their escape, although not without serious loss, the Germans succeeding in cutting in upon their flank at Termonde. Several thousands of the Belgians were captured or driven into Holland, where they were interned, as were also 260 men of the Brit. Naval Division; the remainder ultimately reached the line of the Yser. The evacuation had been completed by the evening of the 8th, and on the following day Antwerp was surrendered to the Germans. It was still in their possession when the war finished (Nov. 11, 1918).

ANZAC, a name by which the Australian and New Zealand troops serving with the British forces during the World War became popularly known. The name originated from the letters indicating 'Australian and New Zealand Army Corps,' when that body was still in Egypt before being transported to the Gallipoli Peninsula, where it so pronouncedly distinguished itself.

AOKI, SHUZO, VISCOUNT (1844) Japanese statesman; was twice ambassador to Germany, once to U.S. (1906-7),

and four times a minister in his own country; presided over revision of treaties with foreign countries (1897).

AEORTA, the large blood-vessel leading from the left ventricle of the heart and sending arterial blood to all parts of the body. It ends by bifurcating into the common iliacs at the fourth lumbar vertebra.

APACHES, North American tribe, definitely subdued, 1880; name also applied to bands of desperadoes who haunt streets of Paris at night.

APE, term used to designate the anthropoid apes only; sometimes used indefinitely for monkeys, baboons, etc.

APELLES, son of Pytheas, flourished latter part of 4th cent.; worked in Macedonia; was the greatest painter of antiquity. None of his works are extant.

APPENNINES (38° to 44° N., 8° to 16° E.), mountain chain beginning in Maritime Alps and extending southward through Italy, and into Sicily; average height about 4000 ft., sinking in the N. to 3500 ft., and rising in centre to about 7000 ft.; highest point, Monte Corno, Gran Sasso d'Italia, (9578 ft.), in central portion of system; highest points in N. are Monte Bue, Monte Cimone; in S., Monte Miletto. Range is crossed by several railways at heights of from 1500 to 2000 ft. A. lie below snow-line. Rivers rising in A. are Po, Arno, Tiber, etc. Marble is found at Carrara, Seravezza, Siena.

APHASIA, loss of the powers of expression and understanding of ideas in speech and writing, resulting from brain lesions. There are several varieties of *a.*, depending on the situation of the lesion and the brain centre thus affected. These may be divided into two groups: 1. motor *a.*, including (a) loss of the power of speech (*aphemia*), (b) loss of the power of writing (*agraphia*); 2. sensory *a.*, including (a) loss of the power of understanding spoken words (*auditory a.*), (b) loss of the power of reading (*visual a.*).

APHELION, point of planet's or comet's orbit most distant from sun.

APHIDES, plant-lice, small homopterous insects of order Hemiptera, destructive to plants; complex life-history; some species are domesticated by ants on account of 'honey-dew' in excretions. American blight and the vine-destroying *Phylloxera vastatrix* are well-known pests.

APHORISM, short, pithy sentence; term first used by the celebrated Gk. physician Hippocrates (d. 361 B.C.),

whose first *aphorism* runs: 'Life is short, art is long.'

APHRODITE (classical myth.), Gk. goddess of love and beauty; dau. of Zeus and Dione; according to one legend A. sprang from the sea-foam (Gk. *aphros*, foam); as wife of Hephaestus (Vulcan) she proved as incontinent as she was beautiful; mother of Eros (Cupid) and the Trojan hero, Aeneas; passionately devoted to Adonis, a beautiful youth, slain by a boar whilst hunting. The swan, dove, swallow, and sparrow were sacred to her; also the rose, myrtle, and apple. In Rom. mythology she bears the name of Venus, and she is also the counterpart of the Phœnician Ashtoreth (Astarté).

APIA (13° 50' S., 171° 44' W.), port, Upolu, Samoan Islands. Pop. c. 4000.

APIARY (Lat. *apis*, bee), a place for keeping beehives. The name is derived in the same way that an aviary is taken from *avis*, a bird. Beekeepers disagree as to the best position of the A., but all maintain it should be impervious to winds.

APICULTURE (Lat. *apis*, a bee), the business of tending an apiary; bee-keeping.

APIS, the sacred bull worshipped by the ancient Egyptians, who was supposed to be the incarnation of Osiris, after Ra, the chief of the Egyptian gods. The black bull chosen had certain distinguishing marks; it was tended with great ceremony; at the end of twenty-five years it was killed and buried with solemn state in the city of Memphis; after which search was made for another bull bearing the identical marks.

APOCALYPSE (Gk. *apokalypsis*, revelation), a work disclosing the hidden; applied to various Jewish and Christian writings grouped as Apocalyptic Literature, and to Book of Revelation.

APOCRYPHA.—This term is generally made to include a large body of lit. which falls into several groups.

(1) *The Apocrypha proper*, those books which are not recognized by Protestants or by the Church of England as equal authority with the Old and New Testaments.

(2) There are, besides, a considerable number of Jewish works, many of them apocalypses, some only recently discovered, which are of great importance for Jewish history of immediately pre-Christian times.

APOGEE, moon's position when farthest from earth: *perigee*, when nearest.

APOLLINARIS (d. 390 A.D.), bp. of Laodicea (Syria); was strongly opposed to Arianism (but denied real humanity of Christ), and was associated with his *f.* in reproducing the Old Testament in verse and the New T. in the form of dialogue.—Those who followed him were called *Apollinarians*.

APOLLINARIS, well in Ahrtal, Rhineland, from which A. water, an alkaline drink is obtained.

APOLLO (classical myth.); the god of pastures, of poetry and music, of oracles; the protector of youth. He was the son of Zeus and Leto, twin brother of Artemis, and was born on Mount Cynthus, in the island of Delos, whither his mother had fled to escape the wrath of Hera. He is generally confounded with the sun-god Helios, and thus becomes Phœbus-Apollo, the god of light, who illumines the world, warms the pastures, and brings forth the kindly fruits of the earth. He is also pre-eminently the god of prophecy, and the temple dedicated to his worship at Delphi, in Greece, was the most famous oracle of the ancient world. The most famous statue of the god is that known as the *Apollo Belvedere*, which originally stood on Mount Actium, and is now in the Vatican.

APOLLODORUS (fl. 300–260 B.C.), a famous writer of Attic comedy, who is said to have produced upwards of forty plays.

APOLLONIUS OF RHODES (222–181 B.C.) Gk. epic poet and rhetorician; pupil of Callimachus; author of the *Argonautica*, a lengthy epic dealing with the story of the Argonauts; Eng. trans. by Way (1901).

APOLLONIUS OF TYRE, hero of an early mediæval romance, derived from a Gk. original. The story found its way into most European languages, was incorporated by Gower in his *Confessio Amantis*, upon which version Shakespeare founded his *Pericles, Prince of Tyre*.

APOLLYON (Gk. 'the destroyer'), the fiend with whom Christian fights in the *Pilgrim's Progress*. Bunyon took the name from *Revelation* 9¹¹.

APOLOGETICS, name given to the systematic defence by Christians of their own religion. Among famous apologetic works are those of Justin Martyr, Origen, and Augustine in the primitive Church, Anselm and St. Thomas Aquinas in mediæval times, and in the 18th cent. Paley and Bishop Butler. In the 19th cent., however, the lines of defence and attack changed somewhat.

In the 20th cent. these lines of apologetic are coming into greater prominence: (1) A tendency to emphasize the moral rather than the miraculous; (2) the importance of evolution in religion—this argument turned back on opponents; (3) the study of comparative religions shows Christianity as the perfection of imperfect faiths, again an adverse argument turned round; (4) psychical research shows existence of other and deeper realities: on the whole easier for Christians than non-Christians.

APOPLEXY, sudden unconsciousness, without any essential change in the pulse and respiration, resulting from cerebral hæmorrhage, embolism, or thrombosis. The unconsciousness must be distinguished from that due to epilepsy, syncope, uræmia, alcoholic or narcotic poisoning. The onset of the attack may sometimes be less sudden, and accompanied by headache, giddiness, confusion of the mind, or loss of power in a limb. The person may sink to coma and death, or he may recover after a short or a prolonged time, a certain degree of paralysis usually remaining, which most frequently affects one side of the body.

A POSTERIORI, method of reasoning which proceeds from effects to causes; experimental, based on induction from observed facts. It is opposed to *a priori* reasoning which proceeds from assumptions to their necessary consequences, from causes to effects.

APOSTLE, one sent upon a mission, particularly by Jesus Christ. The Twelve Apostles were Simon Peter, Andrew, John (s. of Zebedee), James (his bro.), Philip, Bartholomew, Thomas, Matthew, Thaddæus, Simon, James (s. on Alphaeus), and Judas Iscariot. Matthias was chosen in the place of Judas, afterwards. 'The Apostle of the Ardennes' was St. Hubert, bp. of Liège (656-730); 'of the English,' St. Augustine (d. 607); 'of the French,' St. Denis (III. cent.); 'of the Gentiles,' St. Paul; 'of Germany,' St. Boniface (680-755); 'of the Highlanders,' St. Columba (521-97); 'of Hungary,' St. Anastasius (954-1044); 'of the Indies' (West), Bartolomé de Las Casas (1474-1500), and Rev. John Eliot (1603-90); 'of the Indies' (East), St. Francis Xavier (1506-52); 'of Ireland,' St. Patrick (d. 493); 'of the North,' Anscarius (801-64); 'of the Picts,' St. Ninian (IV.-V. cent's); 'of Scot. Reformation,' John Knox (1505-72); and 'of the Slavs,' St. Cyril (IX. cent.).

APOSTLES, ACTS OF THE. See **ACTS OF THE APOSTLES.**

APOSTLES' ISLANDS, twenty-seven Islands Wisconsin, U.S. (46° 55' N., 90° 42' W.); timber; Jesuit missions. Area, 125,000 acres.

APOSTOLIC FATHERS, the name given (first in XVII. cent.) to the Christian Fathers of the two generations after the Apostolic age, roughly, 70-130 A.D. These are (1) St. Clement, who writes from the Church of Rome to the Church of Corinth (second Epistle not genuine); (2) St. Ignatius, bp. of Antioch, martyred c. 110 A.D. Seven Epistles of his are genuine—most important as showing growth of episcopacy; (3) Polycarp, traditional disciple of St. John; P. wrote a letter to the Philippian Church; martyred 155.

The term Apostolic Fathers is used to include also these writings: (4) **EPISTLE OF BARNABAS**, probably not work of the companion of St. Paul; (5) **SHEPHERD OF HERMAS**, a document of the early Roman Church; (6) **TEACHING OF THE TWELVE APOSTLES**, a most important document, probably borrowed in part from a Jewish source, *The Two Ways*, the Teaching (Gk. 'Didache') was only recently discovered. (7) **EXPOSITION OF THE LORD'S ORACLES**, by Papias, bp. of Hierapolis, only preserved in fragments.

The theol. of the A. F's, though very devout and even passionate in loyalty; shows a marked falling off from St. Paul and St. John.

APOSTOLIC SEE, the see of an apostle, (e.g.) Antioch and Alexandria; now generally applied to Rome as See of St. Peter.

APOSTOLIC SUCCESSION, a distinctive doctrine of Catholic Christianity, that the bp's are successors of the Apostles, and that the episcopal order is conveyed by consecration and laying on of hands. According to the Protestant view the bp. is simply an official, and episcopacy not (as with Catholics) something necessary and divinely ordained.

APOSTOLICAL CONSTITUTIONS, **THE**, in eight books, purported to have been written by the Apostles, and have been accepted as genuine by many theologians in ancient and modern times.

APOSTROPHE (Gk. turning away). (1) Term in Gk. rhetoric for suspension of discourse, in order to address a person present, and ultimately applied to such address; hence Eng. application to passionate invocation of any kind. (2) Sign used to denote omission of letter, as in possessive case where original vowel of inflection has been omitted.

APOTHECARY, one who prepares, sells and prescribes drugs. An a. differs

from a chemist and druggist in that he may prescribe drugs in addition to compounding and dispensing them. The Apothecaries' Society of London and Apothecaries' Hall in Dublin are empowered to grant licences to practise med.

APOTHEGM (also *apophthegm*); a terse remark or saying, under which heading many brief proverbs might be classed.

APOTHEOSIS, deification; due to ancestor worship; frequently found in ancient Greece, where dead heroes came to be regarded as gods or demigods. In Rome it really began with the Empire and Emperors were called *divi*; this continued even after conversion of Empire to Christianity. According to Herbert Spencer and others, this is the origin of religion. *a.* is also used figuratively in the sense of glorification.

APPALACHIAN MOUNTAINS (39° N., 77° 30' W.), extend over 1300 miles from N. to S. along Atlantic coast of U.S.A.; divided by Hudson and Richelieu valley and Lake Champlain into two unequal groups — Green and White Mountains to N., Alleghanies and Blue Mountains to S. Highest point is Black Dome (6707 ft.) in Blue Mountains, N. Carolina. *a.* valley divides system lengthwise in S. Railways cross by Mohawk and Potomac valleys, Cumberland and Swannonoa Gaps. Iron ore abounds.

APPALACHICOLA (30° 24' N.; 85° W.), river, Florida, U.S.A.

APPARITION, visualized subconscious ideation, often due to intense emotional experience, or appearance due to suprasensual agencies (ghost or wraith); distinct from an illusion.

APPEAL, in law, process by which a judicial decision is submitted to the review of a higher court.

APPENDICITIS, inflammation of the vermiform appendix of the large intestine, which is a slender, blind tube arising from the inner and back part of the cæcum about $\frac{3}{4}$ of an inch below the ileo-cæcal junction, its average length being about $3\frac{1}{2}$ in. The disease occurs most frequently between the ages of ten and thirty, more often in males than females. It is due to bacterial infection, and may range from a simple catarrh to gangrene of the wall of the appendix. Concretions may, as a result of catarrhal inflammation, be formed in the tube from its fecal contents, resembling date or cherry stones, for which they have been mistaken. Sudden pain, tenderness in the lower part of the right side of the

abdomen, and often vomiting, are the first symptoms. The treatment, in slight cases, with the symptoms improving within twenty-four hours, is to relieve the pain with warm fomentations or an ice-bag on the abdomen, and give nothing by the mouth but sips of hot water; and in severe cases, which are not improving, prompt and early operation.

APPENZELL.—(1) (47° 20' N., 9° 22' E.) German-speaking canton, N.E. Switzerland, 1300 to 8000 ft. above sea-level; divided into Outer Rhodes (Prot.), with cotton and linen-weaving and dyeing, and Inner Rhodes (R.C.), with agriculture. Area, 162 sq. miles. Pop. 1920, 69,950. (2) (47° 20' N., 9° 25' E.) capital of Inner Rhodes. Pop. 5000.

APPERCEPTION, conscious perception, as distinguished from perceptions which pass unnoticed. Term due to Leibniz.

APPIAN WAY, VIA APPIA, ancient road, Rome to Tarentum.

APPLE, fruit of *Pyrus malus*; tree belonging to order Rosaceæ; originally wild (crab-*a.*) in Asia and Europe, now cultivated in over 2000 species in temperate countries for eating, cooking, and manufacture of cider (*q.v.*). Many other fruits, (*e.g.*) custard apple, pineapple, egg apple, have nothing but the name in common.

(1) The '*a.* of Discord' was a golden apple thrown on the table at an Olympian banquet by Discord, and contended for by Hera, Athene, and Aphrodite. Paris, of Troy, when called upon to make the award, gave it to Aphrodite, and thereupon incurred the wrath of the two other deities. (2) When Hippomenes raced with Atalanta (*q.v.*) he cast three golden apples before her, and she, stopping to pick them up, lost the race. (3) The golden apples of the Hesperides (*q.v.*) were guarded by a dragon, and the gathering of these by Hercules constituted his twelfth labour. (4) '*A.* of the eye,' literary epithet referring to something held in great regard. (5) '*A.* of Sodom,' Dead Sea fruit, fair without, but full of ashes.

APPLETON, NATHAN (1779-1861). Amer. manufacturer and politician; introduced power-loom.

APPLETON, city, Wisconsin, U.S. (44° 19' N., 88° 24' W.); on Lake Winnebago; Lawrence Univ.; paper-making. Pop. 19,561.

APPOGGIATURA, ornamental note in musical score used to embellish a melody; is a small note prefixed to a principal note, and may be long or short.

APOMMATTOX COURT-HOUSE (37° 24' N., 78° 49' W.), village, Virginia. Here the Confederate army under Lee surrendered to Grant, 1865.

APPONYI, ALBERT, COUNT (1846) Hungarian statesman; was leader of Conservative National party for many years in opposition before taking office in 1905. In August 1916, speaking as leader of the Independence party, he declared that the opposition considered it necessary to maintain the monarchy's relations with its allies, and approved of the appointment of Hindenburg to command the Austro-Hungarian army in eastern theatre of war.

APPORTIONMENT. The term has its most familiar application as related to the election to the House of Representatives of members whose districts are apportioned according to the growth of population. The present ratio in operation since 1910, the date of the last apportionment based on the decennial census, is one member to each 211,877 inhabitants, but every state has at least one representative. There was no reapportionment following the census of 1920, though several efforts were made to increase the House representation. One objection prevailed that the then House membership (453) was already too cumbersome. In reapportionment of Congressional districts the temptation is always present before the party in power to so recast or gerrymander each State's political divisions that their opponents are kept in a minority in succeeding elections. Under the constitution the ratio was one member to 30,000 inhabitants. Subsequent decennial censuses determined the ratios according to increase of population as follows: 1790 to 1800, one member to each 33,000 inhabitants; 1810, one to each 35,000; 1820, one to each 40,000; 1830, one to each 47,700; 1840, one to each 70,680; 1850, one to each 93,423; 1860, one to each 127,381; 1870, one to each 131,425; 1880, one to each 151,911; 1890, one to each 173,901; 1900, one to each 194,182; and 1910, as above stated.

APPOSITION, grammatical term for placing as subject or object in sentence independent words or phrases explanatory or extensive of each other, not connected by conjunction or relative pronoun. (e.g.) 'The third day comes a frost, a killing frost'; 'This royal throne of kings, this sceptred isle,' etc.

APPREHENSION, term for arrest in Scots law; conception or consciousness of an object without applying criticism.

APPRENTICE, person who serves another in his profession, or trade, for a

fixed period of years. The custom of apprenticeship dates back to about the latter half of the XII. cent., and during the ensuing period, down to comparatively modern times, the term of service was fixed at seven years, after which the a. became a member of the trade guild. The period of apprenticeship is now five years, or less. A master may administer corporal punishment to an apprentice who is under age. The agreement between the parties can only be cancelled by mutual consent, by the bankruptcy or death of the master, or the gross misconduct of the a.

APPROPRIATION, act of setting apart; to assume proprietorship in something; in ecclesiastical law, the annexation of a benefice.

APRAKSI, THEODOR MATRYEEVICH (1671-1728), Russ. general; prominent throughout reign of Peter the Great.

APRICOT (*Prunus armeniaca*), tree with ruddy golden single-stoned succulent fruit, originally cultivated in the East, now also in Europe and N. Amer. The kernels of some varieties, especially Musch-Musch, are edible.

APRIL, 2nd month in the ancient Roman calendar, and the 4th in the modern. It is suggested that the name is derived from Lat. *aperire*, meaning 'to open,' in allusion to the budding of plants and flowers.

APSE, semicircular or polygonal covered recess at end of temple, basilica, or church, a feature in religious arch. from a little before the Christian era. In churches the a. most commonly forms the chancel at the E. end, but transepts often terminate in a's.

APSIS, point in the orbit nearest to or farthest from the centre of attraction, like aphellon or perihellon of a planet, or apogee and perigee of the moon.

APTERYX, bird of same class as ostrich, but smaller; of nocturnal habits; peculiar to New Zealand; rudimentary wings; feathers hair-like or bristly; eggs of extraordinary size; becoming extinct.

APULEIUS, LUCIUS (II. cent.), Latin philosopher and satirist; b. Madaura, in Africa; studied at Carthage and Athens; having m. a rich widow, he was accused by her family of having practised magic to gain her affections. His celebrated *Apologia*, which is still extant, was a successful vindication of his conduct. Apart from this work his fame rests chiefly upon the *Golden Ass*, a discursive romance containing the exquisite interlude concerning Cupid and

Psyche, the work as a whole being a satire upon the vices of the age in general, and of the priesthood in particular. See trans. in Bohn's Classical Library.

APULIA (41° N., 16° E.), territorial division, S.E. Italy, including Foggia, Bari, Lecce; area, 7376 sq. miles; tableland in S., plain in N. Sheep, cattle, and horses are raised; fruits, grain, wine, olive oil produced. Chief ports are Brindisi, Bari, Taranto. Once inhabited by Apuli, Samnite tribe, A. belonged in turn to Romans, Ostrogoths, Lombards, Eastern Empire, Normans, Sicily, Italy. Pop. 2,240,000.

APURE, trib. of Orinoco, Venezuela (6° 47' N., 70° 51' W.); joins main river below San Fernando. Navigable for over 600 m.

APURIMAC. (1) Riv., joining Ucayali, Peru (11° 14' S., 73° 43' W.); swift current. (2) Dep., Peru (14° S., 73° W.). Area 8,187 sq. m.; pop. 180,000.

APUS ('the bird of paradise'), a southern constellation, within 13° of S. Pole, described by Bayer (1603); includes two variable stars, R and S Apodis.

AQUA FORTIS. See **NITROGEN**.

AQUAMARINE, gem stone; transparent blue to greenish-blue variety of beryl; found chiefly in Brazil, Australia, and the Urals.

AQUARIUM, receptacle for keeping living fresh-water or marine animals and plants for amusement or study. The difficulties of preserving natural conditions, chiefly in maintaining the necessary percentage of oxygen, have been overcome by various contrivances found in aquaria connected with biological stations. The finest marine aquaria are kept at Naples, Trieste, Rovigno, Monaco, Villefranche, and Banyuls, for studying Mediterranean fauna and flora; Plymouth, Brighton, Port Erin, Millport, St. Andrews, for Brit. marine biology and fisheries; others at Hamburg, Bergen, Helder, and Roscoff. Numerous marine and lacustrine biological laboratories and aquaria have been founded in America, Japan, and elsewhere, and have been of inestimable value not only to the progress of science but to the rational exploitation of fish supply and fish conservation.

AQUATIC, living in the sea or in fresh water.—A. plants, see **Hydrophytes** (article **PLANTS**).

A. animals occur in almost every group of the animal kingdom. The

include the majority of invertebrates, and the young stages of many creatures which in adult life are terrestrial or aerial. Among their many diversities two features are very common—bodies or projections from the body with large superficial area to facilitate floating, or actively moving, more or less paddle-like (often numerous) appendages for swimming; and more or less gill-like structures which can utilize the oxygen contained in water for purifying the blood.

AQUATINT, a mode of engraving in imitation of washes in color or Indian ink; bitten by acid and not wholly worked by the graver; now fallen into disuse.

AQUA TOFANA, a swift and deadly poison, invented in the 17th cent. by Teofania di Adamo; was used by Borgias and other great Ital. families.

AQUEDUCT, artificial channel for conveying water flowing by gravitation, or under pressure, to supply the needs of a center of population. In level districts traversed by rivers, such as Egypt, Assyria and Babylonia, and parts of the Levant, open canals with reservoirs were used in ancient times. The Phoenicians constructed waterworks of various kinds—for instance, subterranean channels in Cyprus, and the towers for the artesian wells of Ras-el-Ain (Syria). Ancient Gr. aqueducts were very efficient, and consisted of subterranean conduits, as well as basins and pipes of masonry, the best-known examples being those of Samos, Athens, and Syracuse. The Romans, who devoted so much genius to the science and art of water supply, constructed long aqueducts traversing valleys on a tier or tiers of arches. Rome was supplied with water by a dozen aqueducts, of a total length of over 300 m. In the provinces the magnificent existing testimonies to Roman enterprise are chiefly the beautiful Pont-du-Gard, part of the aqueduct to Nîmes, consisting of three tiers of arches, dry masonry except for the cemented channel on top; the aqueduct bridges at Segovia (800 yds. long), Merida, and Tarragona; the aqueduct near Metz and Mainz; and many waterworks in N. Africa, Asia Minor, Dacia, and Greece. The aqueduct of Pyrgos, and the aqueduct of Justinian supplying Constantinople, are notable instances of early mediæval engineering.

In connection with water supply, few aqueduct (in the sense of bridges) of any length have been made in recent years, as an inverted siphon of pipes serves the purpose, and is much less costly.

AQUEOUS HUMOR

The material for the construction of aqueducts necessarily varies with its availability and the nature of the country traversed. In western N. America wood has been used; the so-called 'flumes' cross valleys and are carried along steep slopes on trestles. The Californian flume, used for timber transport, is over 50 m. in length; the High-Line Canal, Colorado, is in places 28 ft. wide and 7 ft. deep; and the San Diego flume (35 m.) is remarkable for its bold design, crossing several hundred trestle bridges. With the progress in iron and steel manufacture and the improvements in concrete, modern water supply is conveyed through cast-iron or steel pipes, their cheapness generally making large masonry works dispensable. Brick-work and concrete are, of course, necessary where tunneling, so-called cut-and-cover work, and foundations for pipes have to be resorted to. Manchester is supplied with about 50,000,000 gal. of water daily by the Thirlmere aqueduct, 96 m. long, of which 14 m. are tunnels. Liverpool receives about 40,000,000 gal. from N. Wales by the Vyrnwy aqueduct. The water supply of Glasgow—one of the best in Europe; up to 100,000,000 gal. from Loch Katrine—is conducted through tunnels and pipes and over bridges of masonry, or through cast-iron troughs across smaller glens. Vienna has a famous aqueduct from springs in the Styrian Alps, 60 m. distant. The Coolgardie aqueduct in Australia is the largest yet made (350 m.), and delivers water at a much greater height above sea-level than its source. New York can receive up to 800,000,000 gal. through the Old and New Croton aqueduct, and the Catskill aqueduct. The latter, completed in 1915, is the largest engineering work of its kind, but the aqueduct of Los Angeles is by far the longest in America. Among the best known canal aqueducts in Great Britain are the Barton aqueduct, carrying the Bridgewater over Manchester Ship Canal, and the Ellesmere Canal, aqueduct across the Dee.

AQUEOUS HUMOR. See EYE.

AQUEOUS ROCKS, those stratified rocks which have been formed by moving waters, such as rivers. See ROCKS.

AQUILA (the Eagle), constellation of N. hemisphere, S.E. of Lyra, known to the ancients.

AQUIFOLIACEÆ, dicotyledonous order of shrubs and trees of about 200 species, chiefly Amer.; the holly is the only European representative. Beverages such as maté (Praguay tea) are

prepared from members of this order.

AQUILA DEGLI ABRUZZI. (1) An Apennine prov., dep. Abruzzi and Molise, E. Italy; cereals, fruits, flax, and hemp produced. Area, 2,493 sq. m.; pop. 423,000. (2) Cap. of above (42° 22' N., 13° 24' E.), founded 13th cent.; saffron lace. Pop. 22,000.

AQUINAS, THOMAS—i.e., of Aquino—(c. 1227-74), theologian and saint; the *Angelic Doctor*; studied at Naples; became Dominican when seventeen; lectured at Rome and Bologna; canonized, 1323; greatest theologian of Western Church since St. Augustine, and greatest of the Schoolmen; best work, *Summa Theologiae*. According to A., reason and revelation are the two sources of knowledge; revelation is based partly on Scripture, partly on the Church; reason and revelation cannot be contradictory, since they both rest on truth; religion and philosophy are complementary, not contradictory. Philosophically A. owes much to Aristotle and Pseudo-Dionysius.

AQUITAINE, old province, in Garonne valley, France; held in turn by Romans, Visigoths, Franks; attained independence under successors of Charlemagne; came to Louis VII. of France through wife Eleanor, who subsequently m. Henry II. of England, uniting A. to Eng. crown, 1152; remained Eng. possession till c. 1451, when passed to France.

ARABESQUE, Moorish ornamental frieze or border, consisting of botanical figures—flowers, foliage, and tendrils—often interlaced in a most fantastic manner. Fine examples are to be seen in the Alhambra and other Moorish palaces of Spain, in some of the Span. cathedrals, and in many of the great Ital. cities.

ARABI PASHA (c. 1839-1912), Egyptian soldier, revolutionary leader, and war minister; b. Lower Egypt; started national Egyptian party; defeated by Wolseley at Tel-el-Kebir (1882); exiled to Ceylon; returned to Egypt (1901).

ARABIA, S.W. Asia (c. 12° 43'-34° 29' N., 35° 59'-30' E.), between Persian Gulf and Gulf of Oman on E. and Red Sea on W.; united to Africa at Isthmus of Suez; length, c. 1,500 m.; average breadth, c. 800 m.; area, c. 1,200,000 sq. m. General surface is plateau with gradual decline from W. and S. to E. and N.; this plateau rises from elevation of 2,500 ft. in N. to over 7,000 ft. in S.W., and is bounded by mt. ranges in S. and W.; between mts. and sea is strip of low fertile land which continues

ARABIA

along practically whole of W. coast and 400 m. along S. coast. Ptolemy subdivided country into *Arabia Petrea* in N.W., *Arabia Felix*, S. and W. coasts, and *Arabia Deserta*, remainder; but this division is obsolete. Northern part of Arabia is desert region, including Syrian Desert and Nafud or Red Desert; to N.W. is peninsula of Sinai. Central Arabia is mainly steppe region interspersed with fertile tracts; in W. is Hejaz in E. El Hasa, and between them is Nejd. Southern Arabia includes great Dahna Desert in interior, Asir and Yemen on W. coast, Hadramut on S. coast, Oman on E. coast. Chief rivers are Wadi Hamd in Hejaz, Wadi Rumma in Nejd, Wadi Shahran, Wadi Besha, Wadi Taraba in Asir. Principal mts. are Tehama range in Hejaz, Asir, and Yemen, all of which it divides lengthwise—among highest peaks are Jebel Sabur, Jebel Hadur; Shammar range in Nejd—highest peak, Jebel Fara; Akhdar Mts. in Oman; Mt. Sinai in N.W. There are volcanic hills in Yemen.

Climate generally is very dry and hot in plains heat is excessive, in mt. ranges of Yemen and Hadramut temp. is more moderate, and in Nejd great cold occurs in winter. Rainy season generally lasts from June till Sept. Simoom, a hot desert wind, blows in N. from interior towards coast.

Geology.—Formation is largely sandstone, with volcanic patches here and there; granite, limestone, and schists also occur.

History.—For some centuries before the Christian era as for some five centuries after, the Arabs had no great history. The main power came gradually to Yemen, which modeled its state system on that of Egypt. In early 6th cent. Abyssinian invasions prepared the way for Mohammed and made Arabs a nation, Mohammed founded a theocratic state.

Reigns of first three Caliphs were time of Arabia's greatest prosperity (632-656); Syria, Egypt, and Persia conquered and Mohammedan dominion spread over N. Africa and into Spain. Caliphs were of Ommlad dynasty from 661 to 749, when Abbasids succeeded, to be followed in turn by Fatimites in early 10th cent. With growth of Mohammedan power in W., and removal of seat of government from Damascus to Bagdad, Arabia's importance gradually declined, and numerous independent principalities arose. Yemen was held by Egypt from about middle of 13th cent., and with Hejaz came into hands of Turks in 1517. Latter belonged to Turkey (except for two short intervals, when it was held by Egypt) down to 1916; former regained virtual independence

in 1633, and was ruled by native princes till 1871, when last native ruler was overthrown and state again passed to Turkey. Eastern state of Oman had meantime become of some importance, retaining independence for several centuries despite Persian attempts at conquest; from 1508 the chief town, Muscat, was held by Portuguese, who were finally banished in 1698, since when it has been ruled by native princes; included in Brit. sphere of influence, 1905. In Central Arabia Wahabi empire was established about 1760 by ~~Abdul~~ Wahab, a religious reformer; Wahabi dominions at one time included El Hasa, Nejd, Mecca, but they lost much of their power by war with Egypt, which ended in their defeat (1818). Following the Turk. overthrow in the Balkan Wars (1912-13), a general Arab revolt against Turkey seemed imminent. The loss of Turk. prestige encouraged ideas of independence which, as will be seen in the following paragraph, fructified during the World War.

Arabia and the World War.—When Turkey threw in her lot with Germany, the sympathy and interest of the Allied Powers were enlisted for the Arabs, and both Great Britain and France gave moral support to the movement for independence. The actual entry of the Arabs into the war occurred after the surrender of General Townshend at Kut (Feb. 1916), at a time when the restoration of Turk. power seemed to be imminent. Early in 1916 Hussein Ibn Ali, high sherif of Mecca, asked for Brit. support, and thereafter Brit. naval forces blockaded the Red Sea coast. Early in June the standard of revolt was raised; Jiddah fell after a bombardment, but Mecca offered a stubborn resistance, and defied the forces of the revolted Arabs, who, under Feisal, third and most able son of the sherif, assisted by a remarkable young Englishman, T. E. Lawrence, were now subjected to a suitable system of training in modern warfare. Meanwhile Hussein assumed the title of King of the Hejaz. In Jan. 1917 a bold course of action was decided upon. Feisal set out with an army of 10,000 men from Yambo, on the Red Sea, moved unobserved across the Turk. front, and captured the port of Weja, 300 m. to the N. of Yambo. By the middle of Feb. all the Red Sea coast up to the Gulf of Akaba was in his hands. He now began a series of raids on the Hejaz Ry., which prevented the Turks from advancing on Mecca. Their troops in Medina became immobilized, and took no further offensive part in the war. Feisal now set himself to form a regular army, and to win over the other chiefs to the national cause,

with the result that, after the lapse of eleven centuries, the whole Arab race was united against the Turks. The Brit. advance to Gaza (Jan. 1917) and the fall of Bagdad (Feb. 11, 1917) undoubtedly assisted in bringing about Arab unity. Akaba was captured in Aug. by a sudden and unexpected attack, and thereafter Faisal's force became the right wing of Allenby's army, operating on a front some 400 m. E. of the Dead Sea and Jordan valley. Raids were constantly made on the railway, and the new army grew daily in efficiency. In April, when Allenby undertook a raid against Amman, Faisal, as a preliminary, attacked Maan station; but though he was unable to occupy the place, he attained his object in holding a large Turk. force from the main attack. In Allenby's wonderful sweep forward to Damascus (Sept. 1918), the Arabs were the first to become engaged. They succeeded in breaking the communications of the 4th Turk. Army, and on Sept. 27 drove the last of their enemies from Deraa and Es Salt. On the same day they joined hands with Allenby's 4th Cavalry Division, and their camel corps became the extreme right of the Brit. line. An Arab detachment was the first Allied force to reach Damascus (night of Sept. 30), being followed by the main army, with Faisal at its head. It also took part in the advance on Aleppo, and was in possession of that city when Turkey capitulated. In March 1920 Faisal's followers crowned him King of Syriaat Damascus. The San Remo Conference (1920), however, gave the mandate for Syria to France and that for Palestine to Britain, to the great discontent of the Arabs. See Faisal.

The Kingdom of Hejaz continued under the rule of Hussein without serious political difficulties or disorders, while the Kingdom of Irak, of which the capital of Bagdad, continued under the rule of Faisal, son of Hussein. In 1921, the Arabs in the central Arabian Emirate of Nejd chose as their sultan Emir Bin Saud, who had expressed a desire for friendly relations with the new state of Irak. During 1921 service was resumed on the Hedjaz railway between Haifa and Amman, the capital of Transjordan. See HEJAZ, KINGDOM OF; IRAK, KINGDOM OF; TRANSJORDANIA; TURKEY.

Divisions.—Hejaz (kingdom); Nejd and Hasa (emirate); Jebel Shammar (emirate); Asir (principate); Yemen (imamate); Oman and Koweit (sultanates); Aden (British.)

Language and Literature.—Oldest pre-Islamic poems are collection called the Mu Allaqat, including poems by Imru'l-

Qais, Tarafa, Zuhair, Labid, 'Amir ibn Kulthum, 'Antara, Al-Harith ibn Hilliza (identity of last two doubtful). Of these Imru'l-Qais and Zuhair rank, with Nabigha Dhubyani, as three greatest Arab poets of this period, to which Samau'al, a port of Jewish descent, also belongs. Earliest prose work is the Koran, consisting of speeches and teaching of Mohammed, said to be revealed to him by an angel; it is written in rhymed prose; its arrangement is artificial, according to length of chapters. Among poets of Ommiad times were Umar ibn Abi Rabi'a, many of whose poems were set to music and became popular songs; Al-Akhtal, who sang the valiant deeds of the caliphs, Ferazdaq, whose specialty was satire, and who was a confirmed plagiarist; and Jarir, rival of last-named satirist, and popular favorite. Chief poets of Abbasid period were Abu Nuwas, 8th cent.; Abu Tammam, and Buhturi, 9th cent.; Ibn Farid was great mystic poet of 13th cent., and Busiri (13th cent.) wrote poem on Mohammed. Among lexicographers and grammarians are Al-Khalil and Abu a-Walid al-Dual; historians, Mohammed ibn Ishaq, who wrote biography of Mohammed, and Tabori, author of universal history. There were many writers on philosophy, including Ibn Tufail and Ibn Roshd in 12th cent.

Resources and Productions.—Arabia has no forests, but there are long stretches of grass, which afford excellent pasture for horses, for which country has long been famed. Large numbers of camels, sheep, goats, and oxen are raised. Vegetable products are dates, coffee, cereals, fruits, spices, drugs, gums, resin, sugar, cotton. Minerals include iron, lead, copper, coal, precious stones. There are few manufactures; coarse linens and woollens made by Bedouin women, also hair bags. Trade is carried on chiefly by caravans, which bring quantities of merchandise both for internal use and to distribute among pilgrims; exports coffee, dates, figs, spices, drugs. Communications are chiefly by sea or caravan, but a railway is laid from Damascus to Medina and under construction to Mecca and Jiddah. Chief seaports, Muscat, on Gulf of Oman, Jiddah and Hodeida, on Red Sea; good harbor at Aden, on S. coast.

Inhabitants are traditionally of the Arab and Ishmaelitic stocks; former represented by agricultural population round coast, latter by Bedouins of desert and Central Arabia. In S. are many Jews. Principal religion is Mohammedanism; every year pilgrimage, or haj, is made to holy city, Mecca. Pop. c. 3,675,000. See MAP AFRICA.

ARABIAN NIGHTS' ENTERTAINMENTS, a collection of tales descended from a Persian book, *Hezar Afsane* ('the thousand tales'); Arab., Ind., and Jewish stories usurped the place of many of the original tales, and the primitive features of the older tales were transformed, doubtless by the wandering Arabian story-tellers. In their present form the stories are saturated with Mohammedan ideals.

ARABIAN SEA (14° 40' N., 68° 58' E.), part of Ind. Ocean, between India and Arabia.

ARABS, general name given to the people who at the present day inhabit, besides Arabia itself, parts of N. Africa and Mesopotamia, and extensive dists. on the coasts of the Red Sea and the Persian Gulf, and who conquered Spain and other parts of S. Europe in Middle Ages. The purest type is found in the neighborhood of Hadramut and Yemen, and amongst the Bedouin nomads of the Central Arab. desert. The Arabs of the coasts are often of very mixed descent. The pure-blooded Arabs are tall, lean, long-limbed, and muscular, brown-skinned, black-eyed, oval-faced, and with handsome features and beautiful teeth. They live simply and abstemiously, and are scrupulously clean in their habits. Their food consists of roughly ground wheat cakes, rice, locusts, mutton and camel's flesh, tea, coffee, butter, dates, etc. In character the Arabs are often proud, revengeful, and treacherous, but are capable of pity and gratitude, and are proverbially hospitable to strangers. Less to their credit is the Arab association with the African slave trade, their victims, over a very long period, having been obtained from the Sudan, Somaliland, and other places. The European powers have made strenuous efforts to suppress this iniquitous traffic, but it was not until the end of the 19th cent. that the trade was arrested to any extent. In 1873 the Sultan of Zanzibar signed a treaty whereby he undertook to suppress the traffic.

ARACHNE (classical myth.), a Lydian weaver who challenged comparison with the work of Athena. The jealous goddess, unable to find any fault, destroyed the work, whereupon A. hanged herself, but was afterwards changed into a spider. The story is related by Ovid.

ARACHNIDA, a heterogeneous class of the phylum Arthropoda, including spiders, mites, scorpions, king-crabs, and trilobites. The anterior segments are usually fused to form a cephalothorax, with six pairs of appendages,

of which the first two are modified for seizing food, and the others contain excretory (coxal) glands. Many forms are provided with an internal plate-like skeleton, the endosternite. An elongated heart is found in the dorsal side of the abdomen. The sexes are separate, and the young generally resemble the adults.

ARACHOSIA, anc. Persian prov. (29° 15'-33° 18' N., 63° 30'-70° 20' E.); on one of main roads to India, travelled by Alexander the Great. Cap., Alexandria Arachoton (now KANDAHAR.)

ARAD AND NEW ARAD (46° 13' N., 21° 17' E.), town, Hungary. Pop. 1919, 63,166.

ARAFAT, hill, Arabia (21° 27' N., 40° 10' E.); on route followed by Mohammed (632); visited by all true pilgrims.

ARAGO, DOMINIQUE FRANCOIS JEAN (1786-1853), Fr. physicist; app. when nineteen, sec. at Paris Observatory; through Laplace's influence became Biot's assistant for meridional measurements. In the Balearic Islands he was imprisoned as a spy, escaped, and, after adventures in N. Africa, returned to France. App. prof. of Analytical Geometry and astronomer of the Paris Observatory at the age of twenty-three, he became famous for his astronomical lectures. With Gay-Lussac he founded the *Annales de chimie et de physique*; for his researches on rotary magnetism he received the Royal Society's Copley Medal, 1825; he further investigated polarization of light, and made numerous other important discoveries in optics and magnetism. A. was a member of the Provisional Government, 1848; his political activity was of great value to Fr. science.

ARAGON (41° 50' N., 0° 30' W.), ancient kingdom, Spain, dating from XI. cent.; capital, Saragossa; united with Castile in 1479; now forms provinces of Huesca, Zaragoza, Teruel; area, 18,294 sq. miles; surface is hill-encircled plain; watered by Ebro. Pop. 1,000,000. See SPAIN.

ARAGONITE (CaCO₃), mineral, discovered in Spain; orthorhombic crystals usually twinned, calcite being its stable dimorph. Fibrous variety of aragonite is termed satin spar.

ARAGUAYA, riv. Brazil, joins the Tocantins (5° 20' S., 48° 42' W.); local navigation; lower course obstructed by rapids. Length, 1,080 m.

ARAKAN. (1) Div., Lower Burma; ceded to Britain, 1826; rice, cotton,

ARAL

timber; cap. Akyab. Area, 18,540 sq. m.; pop. 765,000. (2) Anc. cap. of above (20° 38' N., 93° 7' E.); ruins of fort and city wall; unhealthy situation led to decay. Pop. 5,000.

ARAL (45° N., 60° E.); second largest inland sea, W. Asia; water slightly saline; present area, c. 26,230 sq. miles, but is diminishing; receives waters of Amu-Darya and Sir-Darya; has innumerable islets on E. side, larger ones farther N.; surrounded by desert lands; contains sturgeon, etc.

ARALIA, plant-genus of about thirty-five species, temperate and tropical, gives its name to the Ivy family Araliaceæ; Chin. stimulant ginseng is derived from roots of one of its members.

ARAM, EUGENE (1704-59), Eng. schoolmaster and murderer; b. Ramsgill (Yorks); was self-educated, but acquired considerable learning, and was a schoolmaster at Netherdale, Knaresborough, and Lynn (Norfolk); was the first scholar to draw attention to the affinity existing between the Celtic and other Indo-European languages. He was found guilty of the murder, thirteen years earlier, of Daniel Clark, whose body he hid in a cave at Knaresborough. He eventually confessed his guilt, asserting that Clark had been intimate with his wife, and was hanged at York, after having attempted to commit suicide; subject of novel by Bulwer Lytton, and poem by Thomas Hood.

ARAMAIC, Semitic language, or dialect, anciently spoken in Syria and Mesopotamia. It was employed, amongst others, by the Samaritans, and is believed to have been the language spoken in Palestine during the time of Christ.

ARAN ISLANDS (53° 6' N.; 9° 44' W.), islands, W. Irish coast.

ARANJUEZ, tn., prov. Madrid, Spain (40° 2' N., 3° 36' W.); since time of Isabella the Catholic the spring residence of Span. monarchs.

ARANY, JANOS (1817-82), Hungarian poet; in his early years he led an unsettled life, and was for some time an actor. He first made his mark as a poet with a satirical poem, *The Lost Constitution* (1845). He is perhaps best known as the author of an epic trilogy, *Toldi* (1847), *Toldi's Evening* (1854), *Toldi's Love* (1879). Other poems by him are: *The Conquest of Murany*, *The Death of Buda*, and *The Gypsies of Eida*. He also trans. several plays of Shakespeare, and the *Comedies of Aristophanes*.

ARAPAHO, N. Amer. Indians now found in Oklahoma and Wyoming.

ARBITRATION

ARAPAIMA, genus of tropical freshwater fishes—the largest existing—covered with bony, compound scales. *A. gigas* (S. America) attains 15 ft. in length.

ARARAT (39° 40' N.; 44° 15' E.); mountain, Armenia, traditionally connected with Noah's Ark; consists of double volcanic peak, Great and Little A., respectively c. 17,000 and c. 13,000 ft. above sea-level; also called Mt. Massis; snow-line about 14,000 ft. above sea-level; first ascended in 1829.

ARAS (*Araxes*), Armenian riv., the *Phasis* of Xenophon, rises S. of Erzerum (about 89° N., 41° 10' E.), and flows 600 m. to mouth in the Caspian Sea.

ARAUCAANIA (38° 45' S., 73° 5' W.); territory, Chile, S. America. Araucanians, S. Amer. Indians living in Chile; of fine physique and considerable intelligence, nomadic habits, and warlike spirit, they offered fierce resistance to early Span. invaders.

ARAUCARIA, genus of ten or more species of Coniferae, native in S. America and Australia. Most familiar species is the Chile pine or 'monkey-puzzle' common in Europe.

ARBACES.—(1) Mythical prince who defeated Sardanapalus (q.v.) and established Median empire. (2) General in army of Artaxerxes Memnon, 401 B.C. (3) Hero of Beaumont and Fletcher's *King and No King*.

ARBELA, ARBIL (36° 10' N., 44° 20' E.), town, Assyria; here Alexander the Great finally defeated Darius, 331 B.C. Pop. c. 4000.

ARBITRATION, adjudication of matters in dispute by one or more private persons, called arbitrators, and specially appointed for the purpose, may be *voluntary*, when parties freely consent to the process; or *compulsory*, when they are compelled to do so by statute. Whole law on this subject codified in Arbitration Act.

Industrial, as between employers and employed, is of comparatively recent growth.

International, settlement of differences between independent states by referring matter in dispute to selected persons or to a court; after evidence being tendered, decision is given in accordance with international law. Up to 1901 the number of cases thus dealt with was: Great Britain, 70; U.S., 56; France, 26; and Chile, 26. In 1899 the Tzar proposed a peace conference; held at the Hague (nineteen states sent delegates), and permanent court of arbitration at the Hague set up. Im-

ARBOR DAY

pulse thus given to the cause resulted in adoption by several European states of general treaties of arbitration with one or more of their neighbors. Among such arbitration treaties are those between Chile and Argentina (1902), France and Italy (1903), Britain and Germany (1904), Britain and Portugal (1904), Britain and Austria-Hungary (1905). In 1910 the long dispute between Britain and France as to fishing rights off coast of Brit. N. America was referred to Hague Tribunal and amicably settled. Treaties between U.S., Britain, France, and Spain (1914) provided that in any dispute no action should be taken for twelve months, during which time an international commission should investigate causes of dispute. Progress towards peaceable solution of international disputes suffered a rude shock at outbreak of the World War; but League of Nations forming part of the Peace Treaty, affords the most hopeful method yet propounded for securing ends aimed at by earlier experiments.

ARBOR DAY, a yearly tree-planting day adopted by the majority of states, by some of them as a legal holiday, celebrated on varying dates by the different states. It originated through the growing alarm over the depletion of the American forests, and was intended to encourage the school children to devote one day in the year to planting seedlings. The pioneer state in observing the day was Nebraska, where the observance began in April, 1872. The date of celebration in the different states varies according to climate. In general it is early in the year in the South; in January, in Florida, while some of the more northern states do not observe it till April or May. The 'golden Anniversary' of Arbor Day was celebrated throughout the whole country on April 22, 1922, as a part of Forest Protection Week, by a proclamation from President Harding.

ARBOR VITÆ, common name for the genus *Thuja*, four or five species of shrubs and trees of the cypress conifers.

ARBUTUS. See **MAYFLOWER**.

ARC, part of circumference of circle or other regular curve; part of apparent path of heavenly body; curved flame between two electrodes through which current is passed—electric arc.

ARCADE, a series of arches supported by columns or piers, such as may be seen in the Ducal Palace at Venice; where they appear as relief work against a wall they are termed 'blind arcades,' many examples of which are to be seen

ARCHÆAN SYSTEM

In the older Eng. cathedrals; the term is also used in modern times for a covered avenue between buildings.

ARCADIA (37° 34' N., 22° 13' E.), department, Greece. Shut off by mountains, A. did not share in the civilization of Greece. Inhabitants, a pastoral people mainly, were lovers of music and dancing; hence poetic ideal of A. Pop. 162,000.

ARCACHON, health resort, France (44° 39' N., 1° 12' W.); steam fishing fleet; oyster beds. Pop. 10,200.

ARCADIUS (378-408), Byzantine emperor; s. of Rom. emperor Theodosius, on whose death (395) the empire was divided between A. and his bro. Honorius. A. governed the eastern prefectures; his reign was marked by Alaric's invasion of Gk. peninsula (395-96), and exile of Chrysostom, Constantinopolitan patriarch (404); he was a weak, incompetent emperor.

ARCESILAUS (316-241 B.C.); Gr. philosopher, founder of the New Academy, who, in opposition to the Stoics, held we have no criterion of truth, and therefore denounced dogmatism.

ARCH, the name usually given to the section of a building spanning an opening, or passage, usually curved, and composed of wedge-shaped blocks of stone, or bricks. An a. may be round, pointed, trefoil, or varieties of these shapes. A's are distinguished in architecture by the distinct styles to which they belong; thus all Norman or Romanesque a's are round, the earlier ones plain, while a later development added the familiar zigzag decoration known as 'dog-tooth.' The Norman style was followed by the Gothic, which was pointed, and embraces Early English, Decorated, Perpendicular, and Tudor, covering the historic period from about the end of the XII. cent. to the middle of the XVI. A's have also been built to stand by themselves as triumphal monuments, particularly by the ancients. Surviving examples of this kind are the Arch of Titus (80 A.D.); the Arch of Septimius Severus (203 A.D.); and the Arch of Constantine (312 A.D.), all at Rome. Others at Ancona, Orange, St. Rémy, and elsewhere in Italy and S. France. The Arc de Triomphe de l'Etoile, in Paris, completed in 1836, may be cited as a modern example.

ARCHÆAN SYSTEM. This geological division includes rocks of greater antiquity than the oldest fossil-bearing strata, and has a world-wide distribution, underlying all the others. Its other name is Pre-Cambrian, since it

underlies the Cambrian or Eozoic system, in which the first faint traces of once living organisms appear.

In certain regions the rocks of this system resemble some of the metamorphic, volcanic, and sedimentary rocks of the British Isles, but no precise correlations have yet been made. The finest development of Pre-Cambrian rocks yet described occurs in the basin of the St. Lawrence and in the adjacent parts of the U.S., and also in the Alleghany and Rocky Mts. Their thickness is estimated at 100,000 ft., and their complexity is very great. They contain groups of coarse and finely crystalline gneisses and schists, metamorphosed sediments and unaltered sediments, and volcanic rocks. Logan, their discoverer, described two divisions: (1) Laurentian, or Lower Division, comprising the coarse gneisses and schists, granitoid rocks, and metamorphosed limestones; (2) Huronian, or Upper Division, of finer crystalline rocks, and altered shales, grits, and limestones. Certain unaltered volcanic and sedimentary rocks are now also regarded as Pre-Cambrian. Recent Amer. geologists have modified this grouping.

Enormous areas in China are Pre-Cambrian, and similar rocks have been found in India, Australia, and Africa. In Britain they are largely hidden beneath later formations, but in the N.W. Highlands, the Malvern Hills, Charnwood Forest, and other isolated areas, they have become exposed (after prolonged denudation) along the axes or cores of ancient hill ranges. They also project as prominent crags above areas of younger deposits which once covered them. They have been found also in deep borings. From the fundamental position of these 'ancient' rocks and their properties arose the idea, now generally abandoned, that they represented the primitive crust of the earth. In some Pre-Cambrian rocks distinct traces of recognizable fossils have been found, chiefly in America.

ARCHAEOLOGY, the study of antiquities, which includes the art and architecture, and the customs, manners, and beliefs of early peoples, such as may reasonably be deducted from ancient monuments, and remains discovered in tombs, caves, river-drifts, etc. Archaeology was formerly taken as differing from history, which relies chiefly upon authenticated documents and recorded dates, while archaeology seeks to make out a connected story of man's development on the earth by a comparison of objects found in one country, under certain geological con-

ditions, with similar objects found in another country. But the historian of today, in treating of the periods covered by archaeology, makes use of its material and conclusions; whence archaeology has become, strictly, a department of history.

The science of archaeology is associated, to a certain extent, with the study of geol., philology, and anthropology. Though first applied only to the antiquities of Greece and Rome, the term is now generally understood to refer to the entire range of human development, from the prehistoric period down to the Middle Ages.

The study of archaeology may hardly be said to have been taken up systematically before the 19th cent., and it was the Scandinavians who then attempted to reduce the study to an exact science by classifying the different periods of man's development, and attempting the fixing of their dates. Hereunder is given the classification arrived at by the Danish archaeologist Worsaae: (1) the Early Stone, or Palaeolithic Age, dating back to about 3000 B.C.; (2) the Later Stone, or Neolithic Age (2000-1000 B.C.); (3) the Early Bronze Age (1000-500 B.C.); (4) the Later Bronze Age (500 B.C. to birth of Christ); (5) the Early Iron Age (A.D. 1-450); (6) Middle Iron Age (A.D. 450-700); (7) the Late Iron or Viking Age (8th-11th cent.).

These can only be taken as extremely broad, and by many geologists (whose proper science is the study of the earth's ages) much-controverted conclusions. The assumption deduced from this system of study is that mankind has progressed from a state of savagery to various degrees of culture. This is shown by the domestic implements and weapons used at different periods. Thus it is supposed that wood, bone, or horn were the first substances employed by primitive man for domestic or warlike purposes; these, from their nature, have mostly perished; then came the use of flint, from which were fashioned rude axes, hammers, spear-heads, arrow-heads, knives, etc., which in later developments began to assume some artistic shapes, and were polished and otherwise decorated; then, in due course, followed the use of bronze and iron, as indicated in the foregoing table. It should be borne in mind, however, in using the above definitions, that the term 'Age,' as applied to archaeology, cannot be held to cover any definite period of time, inasmuch as the Early Bronze Age in one country may be contemporaneous with the Stone Age of another. It may be noted that in Scandinavia, and in Scotland, no evidence of man's occupation is yet forth-

coming of an earlier period than the Neolithic Age. In dealing with so vast a subject as archaeology it is not possible here to do more than indicate the main lines of study to be followed, but many of its branches have been dealt with under their several heads. Since the establishment of the London Society of Antiquaries in 1751, and that of Scotland twenty-nine years later, the study of archaeology has spread rapidly, and flourishing societies of like kind are to be found in most provincial centers; while chairs and lectureships in archaeology exist at the leading British universities.

Archaeological research was greatly stimulated in the years following the World War. It was especially true in those countries in which the Turkish Government had imposed restrictions or prohibitions upon the carrying on of excavations. This was especially the case in Palestine. When this country came under the political control of Great Britain, permission was freely obtained to carry on archaeological explorations, and these were begun at once in several important sites, including the ancient city of Beisan, and on the site of Askalon, the famous old Philistine city. Sufficient progress had not been made in 1923 to indicate whether the anticipated discoveries would be made. Explorations in Egypt continued to reveal rich results. The expedition of the Metropolitan Museum of Art, carried on work in 1922-23. The most sensational discovery possibly ever made in Egypt, however, was the finding, in December, 1922, of the tomb of King Tutankhamen, who ruled in the 18th dynasty, about 1360 B.C. The discovery was made by Howard Carter, who had searched for it for many years. The tomb was found practically intact, although there were evidences that it had been entered previously, although nothing important had been taken away. In the outer chambers of the tomb were found treasures of rare beauty and value, including clothing, objects of art, vessels, beds, thrones, chairs, and quantities of vessels of pure gold. The monetary value was many millions of dollars. This is greatly exceeded, however, by the historical value. Some scholars have advanced the theory that Tutankhamen was the Pharaoh of the Oppression.

Interesting excavations were also undertaken on the site of ancient Carthage. These revealed three cities within 20 feet of the surface.

One of the mining discoveries of great interest was one of the galleons of the Spanish Armada, which was found in the mud of Tobermory Bay, Scot-

land.

Several of the mounds in the Mississippi valley were excavated during 1922. Nothing of great importance was found.

ARCHÆOPTERYX, extinct primitive bird, about the size of a crow, two specimens of which have been discovered in the Jurassic (Upper Oolitic) lithographic slates near Solenhofen (Bavaria). Although the possession of well-developed feathers, probably a keeled breastbone, of wings, and a bird-like skull characterize it as a distinct bird, the long tail, the structure of the hand skeleton, and the possession of teeth held in separate sockets, must link it with the reptiles.

ARCHANGEL, or **ARKHANGELSK**. (1) Gov., N. European Russia, including Novaya Zemlya, Vaygach, Kolguev Islands; produces timber, hemp, flax, potatoes; gold, iron, zinc, silver, lead, copper. Fisheries of great value—salmon, navaga, herring, cod. Rivers: Petchora, Mesen, Dvina, Onega. Ekaterina Harbour is ice free. Area, 326,063 sq. m.; pop. 483,500. (2) Seapt. of above (64° 32' N., 40° 33' E.); founded 1553; timber, wheat; annual fish fair. During Great War, only seaport left open to Russia; harbour kept open by ice-breakers; imported war material; exported 3½ million quarters of wheat (May to Dec. 1915); occupied by Brit. force (Aug. 1918). It was occupied also by the American Army until 1920.

ARCHBOLD (41° 30' N., 75° 35' W.); borough, Pennsylvania, U.S.A. Pop. 1920, 8603.

ARCHBISHOP, a chief bp., or the bp. of a province, as well as of his own (arch) diocese; title usually implies metropolitan functions. First recorded use of the title (to denote respect) is by St. Athanasius in IV. cent. Certain Oriental Churches, some branches of Lutheran Church, R.C., and Anglican Churches still use the title, but the powers and functions associated with the title vary. The a's of Canterbury ('Primate of All England') and York ('Primate of England') share ecclesiastical government of Church of England.

ARCHBOLD, JOHN DUSTIN (1848-1916), an American pioneer in the oil industry, b. in Leesburg, Ohio. As a boy he clerked in a country store, then, in 1864, went to the Pennsylvania oil regions, where for eleven years he was active in the oil business, in Oil City. He was chief owner and president of the Achme Oil Co., and when that concern amalgamated with the Standard Oil Co., in 1875, became a director of the larger

corporation. He was one of the nine members of the Board of Trustees of the Standard Oil Co., formed in 1882; of them he alone served throughout the whole period till 1911, when the corporation was dissolved by the Supreme Court of the United States. After that he was president of the Standard Oil Co. of New Jersey. Throughout his business career he was closely associated with John D. Rockefeller. On his death his estate was valued at \$100,000,000, portion of which went to Syracuse University.

ARCHDEACON, official in Christian Church since IV. (possibly III.) cent. At first the a. was chief of deacons, and assisted bp. in various ways, (e.g.) helping the poor and in services of church. A's power increased till XIII. cent., when it declined; now in R.C. Church only nominal. In Anglican Church a's have important functions, holding visitations of clergy, etc.

ARCHDUKE, title borne by members of the former imperial house of Austria; was first formally conferred by the Emperor Frederick III., in 1453, upon his s. Maximilian.

ARCHEAN SYSTEM, or **PRE-CAMBRIAN**, the oldest rocks known, of world-wide distribution and varied composition, but consisting chiefly of gneisses and metamorphic schists of enormous thickness. Owing to manifold mechanical deformations, sub-divisions of the system are difficult to outline, and the occurrence of fossils is extremely rare, so that formerly the term *azoic* (without animal life) was applied to the rocks. These are frequently altered, owing to regional metamorphism, or mingled with sedimentary and volcanic beds, and penetrated by valuable mineral veins. The Lewisian Igneous gneissose formation of N.W. Scotland, corresponding to Laurentian in Canada, and the Dalradian schistose series of Scotland and Scandinavia, corresponding to N. American Hurian, and the Torridonian (Scot.) and Sparagmite (Norway) beds or Keweenaw beds (N. American) are principal subdivisions.

ARCHELAUS, king of Judæa during rule of Augustus; notorious for cruelty.

ARCHELAUS (413-399 B.C.), king of Macedon; protected the exiled Euripides.

ARCHELAUS OF MILETUS (V. cent. B.C.), Gk. philosopher; pupil of Anaxagoras; devoted to the study of cosmology; originated the theory of the earth's spherical form.

ARCHER, **WILLIAM** (1856), a British

author and dramatic critic. b. in Perth, Scotland. After graduating from the University of Edinburgh, he studied law at the Middle Temple, but instead of practicing became a journalist, in London, in 1878. In the following year he became dramatic critic for *Figaro*, and later for *The World*, *The Tribune*, *The Nation* and finally *The Star*. He first became known from his translation of the collected works of Henrik Ibsen, the Norwegian dramatist. He is also the author of a great many other works, among them being *Life of Macready*, *America To-day*, (1900); *Through Afro-America*, (1910); *Play Making*, (1912); *The Thirteen Days*, (1915); *God and Mr. Wells*, (1917); *War is War* (a drama, 1919), and *A National Theatre Scheme and Estimates* (in collaboration with Granville Barker, 1907).

ARCHERY, the art of shooting with the bow and arrow; has been practiced since very ancient times, records and inscriptions proving its existence among the Egyptians, the Israelites, the Assyrians, and the Greeks, while savage tribes are found to-day still using the bow in hunting and in fighting. Perhaps the art was brought to greatest perfection in England in the time of Edward III., and the great victories of Crécy, Poitiers, and Agincourt were won mainly by the skill of Eng. bowmen. The introduction of fire-arms and artillery naturally led to the decline of a., but as late as the battle of Duns Law (1639), the Scot. Highlanders used the bow in warfare.

ARCHIL, purple dye for woollens and silks, extracted from lichens; 'crottle' in Scotland.

ARCHILOCHUS (VII. cent. B.C.), Gk. poet; wrote elegies, hymns, and lampoons, and was the inventor of iambic verse. Horace is said to have been largely influenced by his metres.

ARCHIMEDES (c. 287-212 B.C.), Gk. mathematician; b. Syracuse; studied in Alexandria; returned to native city; accidentally killed after its capture by Romans under Marcellus. Besides being most eminent mathematician of antiquity, he founded the science of hydrostatics, invented engines of war, the waterscrew, and numerous other mechanical contrivances.—The *Archimedean Principle* is that a body immersed in a liquid loses weight by an amount exactly equal to that of the liquid displaced. A. discovered this when taking a bath, and in his excitement rushed naked into the streets, crying 'Eureka! Eureka! I have found

it! I have found it!"—*The Screw of A.*, spiral screw revolving inside watertight cylinder for raising water to higher level.

ARCHIPELAGO, any sea studded with islands; among best examples, Gk. A. and Malay A.

ARCHITECTURE, the art of building; the planning of a structure and its harmonious arrangement and ornamentation according to definite principles, as a work of beauty or grandeur. The beginning of the art is found in the efforts of primitive man to provide shelter for himself, different modes of building being adopted, according to the requirements and customs of the people and the climate of the country. The most elaborate buildings of different countries and different periods may all be traced to the two important materials for building in early times—wood and stone; and on the methods naturally adopted for construction in those two materials all the principles of arch. are founded. In building with wood, the main principle consists in having vertical pillars with beams laid across them, which is called the *trabeate* system; while in building with stone the under-lying principle is the arch and its supports.

Egyptian Architecture.—It is in Egypt that the most ancient records of arch. are found, well-known examples being the Pyramids at Gizeh, near Cairo, dating from 3900 to 3700 B.C., of which the largest, commonly known as the Great Pyramid of Cheops, covers 13 ac. At Beni Hasan there are rock-cut tombs which have fluted columns supporting or appearing to support the overhanging rock, dating from about 2200 B.C. These are the earliest examples of a type of arch. which influenced that of Greece and subsequently of all Europe. From 1700 to 1300 B.C. most of the noblest buildings in Egypt were built, among them the great temple at Karnak, the Hypostyle Hall of which (measuring 340 by 170 ft., and containing 134 columns in sixteen rows) is considered the most beautiful and imposing structure of its kind in the world. From this period also date the great temple at Luxor and the many great buildings of Memphis, Heliopolis, and Thebes. For 1,000 years after this arch. declined, reviving then for a time under the Ptolemies, the Temple of Isis at Philæ being a beautiful example of this period.

Assyrian Architecture.—About 800 B.C., 1,200 years after Nineveh was founded, the Assyrians commenced a period during which many magnificent buildings were erected. The use of the arch was known to them, but the column was not much employed. Some

of the oldest buildings resemble the Pyramids of Egypt, but they were temples, not tombs; while excavations carried out at Nineveh, Nimrud, and elsewhere have revealed the sites of magnificent palaces, the great gateway of Khorsabad, with its massive human-headed winged bulls, parts of which are now in the Brit. Museum, being a well-known example of the style of this period.

Persian Architecture.—Persian arch. was derived to a great extent from that of the Assyrians. Under Darius and Xerxes (c. 500 B.C.) they surpassed even the Assyrians in the magnificence of their palaces, and, using marble where the Assyrians used wood and brick, these have been better preserved. The palaces at Persepolis are the finest examples of their work, the Hall of Xerxes, extending to twice the area of the great Hypostyle Hall of Karnak, being one of the greatest buildings of ancient times. The Ionic and probably the Corinthian capital were developed by the Greeks from Pers. decoration.

Greek Architecture.—Gk. arch. was an original development, as recent discoveries at Crete have proved, although it was influenced in many ways by Egypt and Assyria. An advanced state of civilization existed in Crete about 3000 B.C., when great palaces were built; but this older civilization was swept away by invaders from the north about 1100 B.C., and the oldest Gr. temples, the remains of which have been discovered, date from shortly after this time. The culminating period of Gr. architecture was at Athens from 480 to 400 B.C. There are three styles of classic Gr. arch., each of which is denoted by its particular form of column: the *Doric*, strong and simple; the *Ionic*, graceful and more ornate; and the *Corinthian*, with elaborate detail. The Greeks built their temples with the columns arranged outside, with a view to external effect. The finest example of Gr. arch. still extant is the Parthenon at Athens, built in the Doric style; but it was probably surpassed by the great Ionic temple of Diana at Ephesus, included by the ancients among the seven wonders of the world.

Etruscan and Roman Architecture.—The Etruscans, a race of Eastern origin, were in an advanced state of civilization at the time of the foundation of Rome. They made much use of the arch, one of the oldest examples in existence being the Cloaca Maxima, constructed about 600 B.C. for the purpose of draining the lower parts of Rome. About 200 B.C., Gr. arch. began to influence Rome, and after the capture of Corinth by the Romans in 146 B.C., Gr. architects and

sculptors were employed in constructing the buildings of the city. Roman arch. was thus developed by the application of the arch of the Etruscans to the Gr. style of arch., while voluting was also employed. At first, buildings were erected in solid stone, but in later times problems of arch. were solved with concrete, walls and domes being formed of masses of this material, with false casings, arches, and arcades of marble, stone or brick concealing it. The Romans modified the Gr. columns and evolved two more orders, the *Tuscan*, a simple Etruscan form resembling the Gr. Doric, and the *Composite*, an attempt to combine the Ionic and Corinthian forms. The Colosseum, a great elliptical circus, built of concrete and stone, and ornamented outside by successive tiers of the different orders of columns, still survives at Rome. The excavations at Pompeii have revealed the Roman domestic arch., and at other places in Italy, southern France, and elsewhere in Europe, Asia and Africa there are interesting remains—Nîmes, in the S. of France, for example, having the most perfect existing Roman temple.

Byzantine Architecture.—In the 4th cent. A.D., the Emperor Constantine transferred the seat of the empire to Byzantium or Constantinople, and under him great building enterprises were carried out. The style of arch. was adopted from Rome, and the new capital was also much influenced by Oriental decoration. The dome was the characteristic feature of the Byzantine style, and because of this the plan gradually changed from a long rectangle to a square form of building. The Church of St. Sophia at Constantinople, built A.D. 532-38, is the finest example of the Byzantine style, while the most perfect buildings of this character in Italy are St. Mark's, Venice, and St. Vitale at Ravenna. Russian arch. is a somewhat debased version of the Byzantine style, which has been adopted in the buildings of the Gr. Church, the oldest examples being the 11th cent. cathedrals at Kiev and Novgorod.

Early Christian Architecture.—It was not until the Emperor Constantine recognized Christianity that the early Christians commenced to erect buildings for the purpose of worship, building them more or less on the plan of the Roman basilicas (halls used for commercial and other purposes)—columns, ornaments, and marbles being taken from other buildings for the purpose, or, in some instances, simply making use of the older temples. The earliest Christian building existing now is the church of St. Paul outside the walls (Rome),

erected A.D. 386, and carefully restored at the beginning of the 19th cent. It was built in the form of a square, with a pillared porch, and a semicircular apse opposite the entrance. Transepts were formed later in churches by widening the part of the building farthest from the entrance, in order to provide increased accommodation for the officiating clergy—a plan which subsequently developed into the typical plan of the mediæval cathedral.

The churches, tombs, and other buildings built by the early Christians in Syria from about A.D. 400 to 600 (e.g.) the churches at Kalat-Semen and Kalb-Lauzeh—resemble the basilica type rather than the domed Byzantine type of building, although in the details they show Byzantine influence. The earliest Coptic Christian churches in Egypt also show the basilica plan, but they were probably of independent origin.

Romanesque Architecture.—This term is applied in a general sense to the styles developed from Roman arch. in Western Europe, through the spread of Christianity. Semicircular arches were substituted for the architraves joining the top of the pillars together, the general design being same as that of the Roman basilicas.

In Italy different styles were in vogue in different parts of the country: in Rome the basilican design of the early Christians still flourished; in northern Italy there was a modification termed the *Lombard* style—the roofs of the churches were vaulted, and substantial piers took the place of the pillars, the churches of St. Ambrogio at Milan and St. Michele at Pavia being built in this manner; while in central Italy the *Tuscan* style, more slender and elegant than the Lombard, prevailed. In southern Italy and in Sicily arch. was influenced by the Normans, owing to the Norman occupation of Sicily; and by the Mohammedans, who ruled the island for two cents., an original feature being the pointed arch, which is of Arabic origin.

In France, in addition to the Roman inspiration, a Byzantine influence is noticeable in the S., owing to trade with Venice and the East. In the churches there was a long nave with vaulted roof and with aisles, and transepts generally of small size, an apse at the eastern end with small apses radiating from it, and perhaps a central tower. Buttresses counteracted the lateral thrust of the stone vaulting of the nave—a difficulty which the Romans avoided by building the vaulted roofs in solid concrete, which simply rested upon the walls like a lid. The style of northern France is important to us in the development of

Eng. arch., and it was influenced by Ger. designs as well as by those of southern France, the church of St. Etienne at Caen being a fine example of the style.

In Germany Romanesque arch. was closely modelled on the northern Ital. style, the cathedral built by Charlemagne at Aix-la-Chapelle about the beginning of the 9th cent. being, however, after the Byzantine design of St. Vitale at Ravenna; and along the Rhine the Romanesque manner reached a high standard of development, the cathedrals at Mainz, Worms, and Spire being good examples. Features of the Rhenish churches are the square or octagonal turrets, and arcaded galleries decorating the walls.

In England the *Anglo-Saxon* style was evolved by the builders copying the remains of the Roman buildings; and as they were more accustomed to the use of wood, the earliest A.S. buildings were either in wood or were imitations in stone of wooden structures. The nave of Greenstead Church is the wooden building now existing which probably dates from the A.S. period, but the churches at Earl's Barton, Monk-wearmouth, and perhaps St. Regulus in St. Andrews, are built in stone in this style. Even before the Conquest, Norman arch. was making its influence felt in England, through builders, artists, and ecclesiastics coming from abroad. At first the style was almost as plain as the A.S., but we soon find it characterized by rich carving based on geometric forms, zigzags, stars, frets, etc., massive pillars and walls, cubical capitals, the decoration of the wall surfaces with arcades and the plans show greater length in the choirs, transepts, and naves than was usual in Normandy. Several thousand churches built in the *Norman* style of arch. were in existence in England within a cent. of the Conquest. Among the many examples still in existence are Durham cathedral, Ely cathedral, the crypt of Canterbury cathedral, and in Scotland Kirkwall cathedral, Kelso and Jedburgh Abbeys.

Gothic Architecture.—Gothic arch. was developed from Romanesque as a solution of the difficulty of vaulting, as the semicircular arch was found not to be successful for this purpose unless heavily loaded on the haunches, and owing to the lateral thrust it was necessary to reduce the span. The pointed arch was therefore adopted, first of all in southern France, where it was probably borrowed from the East; and in order to vault oblong spaces ribbed vaulting was carried out, in which a skeleton of ribs going transversely and diagonally across

the nave made a framework which was filled in with lighter masonry, and the thrust was brought to bear on separate points, the wall being strengthened at those points by *buttresses*. The thrust being thus borne by the buttresses, the need for massive walls disappeared, so that the spaces between the buttresses began to be filled with great windows, and with the invention of painted glass these windows became one of the chief glories of the Gothic style, the spaces of the windows being divided up, in later times very elaborately, by window tracery. When aisles were introduced at the sides of the naves the buttresses could not be carried straight down, and flying buttresses, which bridged over the space between the roof of the aisles and the nave, were constructed, and soon became a distinctive feature of the style. The cathedral of St. Denis is the earliest existing example of Early Gothic arch., while soon after its foundation Notre Dame at Paris was begun, together with the great cathedrals at Amiens (the finest example of pure Gothic), Chartres, Reims, Beauvais, Bourges, and many other places. The principles of the style later developed into the *Flamboyant* style, with great elaboration of detail and profusion of ornament, fantastic and magnificent carvings. Examples of this decadent style are found in the church of St. Maclou at Rouen and the facades of the cathedrals of Rouen, Reims, and Troyes.

Gothic arch. was adapted to all kinds of civic buildings, houses, and even shops, of which examples may be seen in many old Fr. towns. It was introduced into England at the time of the rebuilding of Canterbury Cathedral in the 12th cent., from France; but a distinctive Eng. style of arch. was soon developed, called *Early English*, characterized by long and narrow pointed windows with little tracery, simple spires, high roofs, deep buttresses, slender columns with plain or foliage circular capitals and deeply cut mouldings to the arches. In plan, also, there are differences from the Fr. style, the transepts being more prominent: Salisbury Cathedral, for instance, has two transepts. The nave and transepts of Westminster Abbey and Elgin Cathedral are built in this style.

Towards the end of the 13th cent. there was a transition to a more elaborate manner of arch., the *Middle Pointed* or *Decorated* style, in which the windows are wider and divided by millions, with tracery, at first geometrical, but later wavy and varied; in the upper part, the buttresses are more decorated, and the ornamentation and capitals of columns are richly carved. This is

generally considered the finest period of the Gothic style, and is exemplified in the nave of York Minster and in parts of Melrose Abbey.

A cent. or more later this developed into the *Late Pointed* or *Perpendicular* style, marked by vertical tracery in the windows, panelling of the walls, flattened four-centred (Tudor) arches, fan tracery, and other elaborations of the vaulting; Henry VII.'s Chapel at Westminster and the E. window of Melrose Abbey are in this style, as are many churches in the S.W. of England.

In Italy the Gothic style of arch. never became popular. The earliest examples of Gothic work were carried out by Dominican or Franciscan friars from Fr. and Ger. prototypes, the church of St. Francis at Assisi (1228-53) being a remarkable piece of early Ital. Gothic arch., notable for its wall frescoes. The Gothic cathedrals in Italy are of very great size. The vast cathedral of Milan, the church of St. Petronio at Bologna, designed on an even larger scale, the cathedrals of Siena, Florence, and Ferrara, are all instances of the grandeur and the defects of this period and this type of Ital. arch. In Venice the Byzantine arch. was blended with the Gothic, a famous example being the Doge's Palace.

In Germany the best examples are directly modelled upon the great Fr. cathedrals, Cologne being little more than an enlargement, with differences in the detail, of Amiens. Strasbourg Cathedral also shows the Fr. influence strongly. There are many town halls and other public buildings in Germany dating from this period, built in Gothic style.

In Belgium the church of Notre Dame, at Antwerp, built in this style about 1360, is remarkable in having three aisles on each side of the nave, making its breadth equal to half its entire length; St. Croix, St. Martin, and St. Jacques at Liège, St. Bavon at Ghent, and Notre Dame at Bruges are good examples of the period, a notable feature of the Belgian churches being the richly decorated rood screens. The town halls of Brussels and Mons, and trade halls at Ghent and elsewhere, show the style magnificently adapted to secular purposes.

With the exception of the choir of the cathedral of Utrecht and one or two minor churches, Holland has no eccles. Gothic work of importance, and there are but few examples of the style in domestic or civic architecture.

Spain, however, has several magnificent Gothic cathedrals. The cathedrals of Toledo, Leon, and Burgos, built in the Early Pointed style, are imposing

in plan and beautiful in detail—the first being surpassed in size only by the cathedrals of Milan and Seville, while its general design is finer than that of either. Seville Cathedral (of later date), which has a very elaborate interior, and is the largest of mediæval cathedrals, was built on a site formerly occupied by and practically on the same plan as a great Moorish mosque.

Renaissance Architecture.—With the revival of classical literature and art in Italy in the 15th cent. there came the revival of classical arch., a style which had never altogether died out. In 1420 Brunelleschi was entrusted with the task of completing the cathedral designed by Arnolfo del Cambio in Florence, and constructed a great dome over it, while he afterwards built several churches and other buildings modeled on classical forms. There sprang up a school of architects in Florence (Alberti, the author of several books on arch., being the chief) who followed the lead of Brunelleschi, and constructed many great churches and palaces according to the classical ideas. These buildings are distinguished by a strong and massive appearance, the front of the stones on the lower parts of the walls being left rough, with deep channels at the joints. Milan adopted the classical ideas of Florence half a century later, and Venice was later still, developing a characteristic elegance of design with evidences still of Byzantine influence. St. Mark's Library and many of the palaces on the Grand Canal are built in this style. The classical movement did not begin to make headway in Rome till the beginning of the 16th cent., when Bramante commenced the building of St. Peter's for Pope Julius II. in the classical style; but on his death, about six years later, the work was handed over to several successive architects, and little progress was made with it until it was confided to Michelangelo. He died before the completion of the building, but it was finished according to his designs and models. St. Peter's is the largest church in the world, being almost 600 ft. in length, while the dome, 140 ft. in diameter, rises to a height of 430 ft. The interior, however, is lacking in imposing effect, as there is nothing to give it proper scale.

Towards the end of the 15th cent. the arch. of the Renaissance began to affect France, a style developing in which classical details were applied to general designs in the Gothic style: the Chateau of Blois (built about 1525), with its famous external staircase, is an example—the buttresses being replaced by pilasters and panels, the windows, chimneys, and similar parts of Gothic

shape but with Renaissance detail. A later stage of the style is shown in the Louvre and the Tuileries in Paris; and since the building of the Louvre progressed slowly through several cents., the changes in and gradual development of the style are excellently shown. The Luxembourg Palace, with rough stone facade like the Venetian palaces, the Hotel des Invalides, with a fine central dome, and the Panthéon, formerly the church of Ste. Geneviève, simply designed and with a dome modelled on that of St. Peter's at Rome, all three in Paris, are imposing examples of this Fr. style.

In England, as in France, the introduction of classical forms of arch. was a very gradual process. Gothic arch. had developed into a florid style usually termed *Tudor*, with flat, wide arches, elaborate and interlacing vaulted ceilings, and in domestic buildings characteristic rectangular or polygonal low windows, octagonal towers at the entrances and elsewhere, highly ornamented doorways, while the long gallery, usually on an upper floor, was a distinctive feature. Classical details began to be added. Haddon Hall, for instance, built in the Tudor style, has classical detail of a modified type in its later parts, and at Hampton Court and elsewhere, as well as in many tombs, entrance gateways, and similar smaller pieces of arch., classical details are incorporated. Hatfield House, Holland House, and Heriot's Hospital (Edinburgh) are well-known examples of the style of this period. In Wollaton Hall (built about 1590) the classical orders were freely used, along with other classical details, for the decoration. Inigo Jones (1572-1652), who had studied arch. in Italy, built many noble edifices on classical models. His finest work was the designing of a great palace for Charles I. in Whitehall, the imposing banqueting-hall being, however, the only part actually built. Sir Christopher Wren (1632-1723) was more fortunate in his opportunities, for soon after he had made a name as an architect, the Great Fire of London opened a wide field for him. He designed over fifty churches, the Royal Exchange, Chelsea and Greenwich Hospitals, and numerous other great buildings, and rebuilt St. Paul's Cathedral on the lines of St. Peter's at Rome. The successors of Wren—Hawksmoor, Vanbrugh (the designer of Blenheim Palace), and others—built many works of note in the same classical spirit, and later in the 18th cent. Somerset House (built by Sir William Chambers), the Mansion House, and the Bank of England exemplify the imposing effects of the style.

In Spain the classical style was grafted on to the Late Gothic arch., and is distinguished by the plainness of the walls of buildings, decorative features being reserved for entrances and windows, while the upper story is often adorned by an open arcade. The cathedral of Valladolid and the portal of the cathedral of Malaga are among the best examples of Spain. Renaissance arch. as applied to churches, those of this period being often notable for their magnificent iron grilles to the chapels. Civic buildings were greatly influenced by the Moorish style, one of the earliest being the palace adjoining the Alhambra at Granada, while the enormous palace of the Escorial at Madrid is of Renaissance design.

Mohammedan Architecture.—The first palaces of worship of the Mohammedans were not of definite design, any suitable building being employed for the purpose; but gradually a distinctive style was built up of Egyptian, Roman, and Byzantine elements, differing in detail in the different Mohammedan countries, mosques being constructed so that the worshippers faced towards Mecca, the birthplace of the Prophet, the general form being flat-roofed, arcaded cloisters enclosing a square courtyard. The earliest appearance of the pointed arch is in the mosque of Tulun in Cairo (built in 879), and it is a characteristic of the style, except in the Barbary states and Spain, where the horseshoe arch is more popular. Slender minarets, generally octagonal and of various designs, for the purpose of calling the faithful to prayer, were at an early period added to the mosques. The Alhambra at Granada (begun in 1248), a great palace and citadel, is the finest building in this style, the Alcazar at Seville and the mosque at Cordova being in a more dilapidated or much altered condition. On the capture of Constantinople by the Turks the church of St. Sophia was converted into a mosque, and it has since served as a model, with the addition of actual Mohammedan details, for Mohammedan mosques.

Indian Architecture.—Architectural history begins with introduction of stone in 250 B.C. in place of wood, in reign of Buddhist emperor Asoka. There are six styles.

(1) Buddhist (India and Ceylon); principal objects—(a) *stambhas* or *lots*, pillars bearing inscriptions on shafts; (b) *stupas* or *topes*, relic-shrines—most important groups, Bhilsa and Amaravati Stupas; (c) *rails* surrounding tops, etc.—most interesting at Bharaut; (d) *chaityas* or assembly halls, corresponding to Christian church in use, plan, position of altar, aisles, etc.—extant examples all

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rock-cut chiefly in Bombay Presidency; (e) *viharas* or monasteries, principal ones at Ellora, Ajanta, Nasik.

(2) Dravidian (S. India); best period, 15th to 18th cent. A.D. Temples consist of four parts: (a) principal part, *vimana*, square in plan, surmounted by pyramidal roof of one or more stories, and containing cell in which image of god is placed; (b) porches, *mantapams*, covering and preceding door leading to cell; (c) gate pyramids, *gopurams*, principal features in quadrangular enclosures surrounding more notable temples; (d) pillared halls or *chavadis*. Famous temples: Tanjore, Conjivaram, Rameswar, Madura.

(3) Chalukyan (Deccan and Mysore); arose from Dravidian, but became distinct c. 10th cent. A.D.; plan generally Dravidian, but corners more prominent and pillars markedly different; favorite arrangement was grouping of three shrines round central *mandap* or hall; best specimen at Ittagi (Haidarabad).

(4) Jaina arch., like religion closely resembles Buddhist; Orissa rock-cut caves date from 2nd cent. B.C.; characteristic structural feature of style is twelve-pillared dome; temples generally grouped together in 'cities' on summits of hills. Famous 'cities of temples' are Satrunjaya, Girnar, Mt. Abu.

(5) Indo-Aryan (N. India), most interesting and complete Hindu style. Chief features: curvilinear outline of pyramid on polygonal base; no stories; no pillars. Best examples. Orissa group of temples, particularly Bhuvaneshwar and Jagannath.

(6) Indian Saracenic, introduced by Mohammedans and possessing characteristic Saracenic features; about fifteen styles, divisible into two periods: (a) A.D. 1000-1500; Pathan and other styles moulded by strong Hindu and Jain influences; (b) A.D. 1500-1750; brilliant Mogul style which created Taj Mahal and Moti Masjid (Agra), Akbar's Tomb (Silkandra), Mosque and Palaces (Delhi).

Modern Architecture. — During the 19th cent. England has passed through several periods of revivals of different styles of arch. At the beginning of the cent. there was a revival in classical arch., the church of St. Pancras and Univ. Coll. in London, the old Parliament House in Dublin (now the Bank of Ireland), and the Art Galleries and Royal High School in Edinburgh being good examples of the period, modelled upon Gr. prototypes. St. George's Hall, Liverpool, was somewhat later in date, and marks the culmination of the revival. In the latter part of the cent. the Renaissance style was generally adopted for civil and domestic arch., particularly in the modified form known as the *Queen Anne* style.

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In France the Renaissance style is the most popular fashion of arch., the new Sorbonne and the Ecole de Médecine being imposing edifices designed according to its principles. In Germany, Italy, Belgium, and Austria the tendency has been to follow pure classical examples, the Law Courts at Brussels being a very remarkable example of modern genius applied to the classical style, while in Germany there is also a tendency towards Renaissance arch. Mention must also be made of an important revival of Byzantine arch. at the beginning of the 20th cent. in England, the R.C. cathedral of Westminster being an imposing structure in this style.

In America there has been a development of tower-like buildings, or 'skyscrapers,' composed of a great number of stories to which access is gained by elevators, due at first to the restricted space of the business quarter of New York, but now characteristic of all the great American cities, and laterally constructed of frameworks of steel, on which the building really depends, with an outer shell of masonry. The most notable development in American domestic arch. has been the employment of the Georgian Colonial style, and the adoption of models of English houses to American conditions.

ARCHITRAVE, architectural name for chief beam in an entablature, resting directly upon the columns.

ARCHIVES (Gr. *archeion*; state depository), place where Ms. records are kept. Eng. national depository is known as Record Office; those of France, Germany, and other countries are called National or State archives.

ARCHON, the chief Athenian magistrate after the abolition of the monarchy following the death of King Codrus (c. 1068 B.C.). The latter's s., Medon, was the first a., and the office was at first for life. At a later period it was limited to ten years, and though first confined to the descendants of Codrus, it was afterwards open to the nobles, and finally to all citizens. In 683 B.C. the office was limited to a year only. During the VII. cent., besides the first, or king's a., there was a second who had control of the religious affairs, a third who was the commander-in-chief, besides six judges, or 'keepers of the law,' thus raising the number of a.'s to nine.

ARCOLA (45° 20' N.; 11° 17' E.), village, Italy; Austrians defeated by Napoleon, 1796.

ARCTIC (Gr. *arctos*, 'the Great Bear'). N. Polar regions (66° 30' N.).

ARCTIC REGIONS. See **POLAR REGIONS.**

ARCTURUS (α Bootes), most brilliant star in northern hemisphere, in line with tail of Great Bear; photometric magnitude 0.07.

ARDAHAN, fort. tn., Transcaucasia ($41^{\circ} 5' N.$, $42^{\circ} 43' E.$); ceded to Russia by Turks (1878); evacuated 1918.

ARDEBIL, tn., N.W. Persia ($38^{\circ} 14' N.$, $48^{\circ} 17' E.$); shrine of Sheikh Sufi attracts many pilgrims. Pop. c. 15,000.

ARDECHE, dep., France ($44^{\circ} 37' N.$, $4^{\circ} 20' E.$); mountainous; occupied by Cévennes; drained by Ardèche R. Olives, vines, mulberries, silk; iron, coal, zinc, and lead. Pop. 335,000.

ARDEN, FOREST OF (c. $52^{\circ} 15' N.$, $1^{\circ} 50' W.$), one of the largest of ancient British forests, said to have extended from Avon to Trent; now wooded district, N. Warwickshire.

ARDENNES. (1) Hilly dist., France and Belgium ($50^{\circ} 5' N.$, $5^{\circ} 30' E.$); beech and pine forests; agriculture, stock-breeding. (2) Dep., N. France ($49^{\circ} 40' N.$, $4^{\circ} 40' E.$); hilly, forest country; crossed by Ardennes Canal joining Meuse and Aisne; iron, textiles, sheep; contains Sedan. Area, 2,028 sq. m.; pop. 318,900.

Fighting in Ardennes.—In the opening days of the Great War, German troops were massed in Luxemburg and the Ardennes. They used four routes for their advance into Belgium: (1) Through Luxemburg in S. Ardennes and central Meuse valley; (2) through Malmédy to Ardennes and Meuse at Dinant, Namur, and Huy; (3) from Aix-la-Chapelle via Verviers down Vesdre valley to Liège; (4) by road from Aix to crossing of Meuse at Visé. The capture of Liège (Aug. 7, 1914) opened the gate between Visé and Ardennes, and general advance began by the hill roads of the Ardennes and the railway lines of Luxemburg as well as by Belgium. With the fall of Namur (Aug. 22) the Allied defence of the Meuse collapsed, and the Germans poured into northern France. At the time of the armistice (Nov. 11, 1918) they were in process of being thrown back through the Ardennes whence they had come.

ARDENNES ($49^{\circ} 33' N.$, $4^{\circ} 30' E.$), department, France; hilly, forest country; crossed by A. canal, connecting Meuse and Aisne; woolens, iron and copper works; cereals, fruit, potatoes; contains Sedan; area, 2,027 sq. miles. Pop. 300,000.

ARDITI, LUIGI (1822–1903), Ital. composer; known for his vocal waltz,

N. Bacio, and his operas, *La Spia* and *I Briganti*.

ARDMORE, tn., Oklahoma, U.S. ($34^{\circ} 11' N.$, $97^{\circ} 8' W.$); cotton, coal-mining. Pop. 14,181.

ARDNAMURCHAN. (1) Par. and vil., Scotland ($56^{\circ} 44' N.$, $6^{\circ} 14' W.$). Pop. 1,500. (2) A. Point, most westerly point of Scot. mainland; many wrecks.

ARDOCH, par. and vil., Perthshire, Scotland ($56^{\circ} 17' N.$, $3^{\circ} 52' W.$); Roman camp; early Brit. town. Pop. 900.

ARDROSSAN ($55^{\circ} 39' N.$, $4^{\circ} 49' W.$), port, Ayrshire; good harbor; service to Ireland; shipbuilding. Pop. 6,000.

ARE, unit of superficial measurement in Fr. metric system, being 100 sq. metres or 119.6 sq. yds.

ARECA. See **BETEL-NUT PALM.**

ARECIBO ($18^{\circ} 31' N.$, $66^{\circ} 47' W.$), port, Porto Rico. Pop. 9000.

AREOPAGUS (c. $37^{\circ} 58' N.$, $23^{\circ} 44' E.$), hill, Athens; about 360 ft. high; often called Hill of Mars (mentioned in *Acts*); gave name to oldest Athenian court which met in open air and was composed of former chief-magistrates of Athens. Its functions were modified by Solon's reforms in constitution, 594 B.C.; and its influence was decreased when Cleisthenes established his democratic constitution. In later times most of its functions were transferred to other bodies; existed in Roman times.

AREQUIPA ($16^{\circ} 22' S.$, $72^{\circ} 12' W.$), department, Peru. Area, 22,000 sq. m. Pop. 172,000.

AREQUIPA ($16^{\circ} 20' S.$, $71^{\circ} 35' W.$), cathedral town, Peru; Mt. Harvard University Astronomical Observatory is located here. Pop. 40,000.

ARES (classical myth.), the god of war, who revelled in slaughter, and was hated by all the deities of Olympus, save Aphrodite alone. He was wounded by Diomedes at the siege of Troy; known to the Romans under the name of Mars.

ARETHUSA (classical myth.), a nymph of Artemis, by whom she was changed into a fountain to enable her to escape the pursuit of the river-god Alpheus. The famous fountain bearing her name is in the island of Ortygia, near Syracuse.

ARETINO, PIETRO (1492–1556), Ital. author; writer of comedies, sonnets, and dialogues, many of which were satirical, and all licentious. He called himself the 'Scourge of Princes,' and succeeded in wringing money out of the

nobility and other eminent people, who went in fear of his satire.

AREZZO (43° 28' N., 11° 52' E.).—(1) cathedral town, Italy; birthplace of Petrarch, Guido, Vasari; interesting buildings and artistic remains. Pop., commune, 50,093. (2) province, Italy; area, 1273 sq. miles. Pop. 292,800.

ARGALL, SIR SAMUEL (c. 1580–1626), Eng. administrator of Virginia (1617–19); defeated Indians, 1612; Fr. in Nova Scotia, 1613; and assisted in attack on Cadiz, 1625–26.

ARGAND BURNER, invention (c. 1782) of Aimé Argand, a native of Geneva, by which lighting power of oil lamps was steadied and much increased.

ARGENSON, D', name of a Fr. family, some members of which were intimately connected with national affairs from the time of Louis VIII. down to the latter half of the XIX. cent. (1) *Rene de Voyer, Seigneur d'A.* (1596–1651), enjoyed the favor of Cardinal Richelieu, to whom he owed various State appointments, and was made Ambassador to Venice by Mazarin. (2) *Marc Rene de Voyer, Marquis d'A.* (1652–1721), was Chief of Police in Paris (1697–1718), Pres. of the Council of Finance (1718–20) during which time he became implicated in the disastrous financial schemes of John Law, which brought about his downfall. (3) *Rene Louis Voyer, Marquis d'A.* (1694–1757), s. of the preceding, Sec. for Foreign Affairs (1744–47), author of *Considerations sur le Gouvernement de France* (1764), but is chiefly remembered by his *Memoires*, which are full of valuable information regarding the period in which he lived. (4) *Marc Pierre de Voyer, Count d'A.* (1696–1764), bro. of last-named; War Minister (1742–57); was the friend of Diderot and Voltaire; incurred the dislike of Madame de Pompadour, through whom he was exiled, but was permitted to return to Paris after her death. (5) *Marc Rene de Voyer, Marquis d'A.* (1771–1842), who was some time aide-de-camp to Lafayette during the Revolution, but was later wrongfully denounced as a royalist conspirator.

ARGENTA, a city of Arkansas; railroad shops, cotton mills, iron works. Has hospital. Pop. 1920, 14,048.

ARGENTINE REPUBLIC, federal republic, S. America (22° 40'–54° 10' S., 53° 30'–73° W.); length, c. 2,300 m.; width, c. 800 m.; area, 1,135,840 sq. m.; bounded N. by Bolivia, N.E. by Paraguay, E. by Brazil, Uruguay, S. Atlantic, W. by Chile. Surface slopes gradually from foothills of Andes on W. towards E.,

and almost whole consists of great plains. Of flat ground, northern part is densely wooded, central pampas portion has great stretches of treeless pasture, and southern portion contains expanses of stony desert with patches of stunted thorn bush. Drainage of N. and centre is carried off by Parana (with tribes Pilcomayo, Vermejo, Salado), and Uruguay, which forms boundary with republic of Uruguay; farther S. are rivers of Colorado, Negro, Chubut, Chico, and Santa Cruz; and in interior numerous streams end in marshes. Nahuel Huapi is largest lake. Rainfall over great part of the country is from 30 to 40 in., but diminishes in San Juan to c. 2 in.

History.—Aborigines found only in Chaco, Patagonia, and Tierra del Fuego. History begins with coming of Spaniards to River Plate in 16th cent. First explorer, Juan Diaz de Solis, was killed and devoured by natives (1515); Cabot's expedition in 1526–7, though more successful, had no permanent effect. Mendoza in 1535 founded first town at Buenos Aires, which was continually beleaguered by Indians and abandoned soon afterwards. Other explorers followed, but not until 1580 was permanent town built at Buenos Aires by Juan de Garay, who had already founded Santa Fé at junction of Parana and Paraguay. In 1818 River Plate country was divided into two provinces, marking beginning of Argentine, which then included Buenos Aires, Santa Fé, Entre Rios, Corrientes, Uruguay; whole remained under viceroyalty of Peru. Governor at this time was Saavedra, founder of Argentine prosperity, and one of great heroes of Argentine history. In 1788 Argentine became a viceroyalty, and under Cevallos, first viceroy, trade was greatly expanded. During Fr. revolutionary wars Great Britain, considering Spain's consent to a financial subsidy of France an act of hostility, sent two expeditions against Buenos Aires, both of which were repulsed by Argentines unaided by mother country. This led to formation of patriotic party. Spain's authority was set aside and independent government formed (May 25, 1810); struggle ensued; independence formally declared (1816). After several victories gained by San Martin (great national hero) over Span. troops, congress met at Buenos Aires after tyrannical despotism of Rosas (1835–52). New constitution was formed in 1853, which, with modifications introduced in 1862 and 1898, still exists. Since establishment of autonomy principal events have been war against Brazil (1825–7); against Paraguay (1865–70); various revolts and revolutions, after one of which, in 1890, there occurred a great financial crisis, a

notable feature of which was the embarrassment of the London bankers, Baring Brothers. There have also been boundary disputes with Brazil and Chile, settled respectively in 1895 and 1902, and arbitration treaties with Italy (1907) and Brazil (1908).

Government.— Republic consists of fourteen provinces and ten territories. Of former, four—Buenos Aires, Santa Fé, Entre Rios, Corrientes—lie along River Plate; four—La Rioja, Catamarca, San Juan, Mendoza—along Andes; three—Cordoba, San Luis, Santiago del Estero—in centre; three—Tucuman, Salta, Jujuy—in N. Territories are Formosa, Chaco, Misiones, Pampa, Rio Negro, Neuquen, Chubut, Santa Cruz, Tierra del Fuego. Constitution (1853) is based on U.S. President is elected for six years by specially chosen representatives of provinces. National Congress comprises senate (thirty members) and house of deputies (number of members varies according to population; in 1910, 120). Vice-president acts as chairman of senate. Ministry consists of eight secretaries of state. Each province has its own legislature and local self-government; territories are under federal governors. Chief towns are Buenos Aires (cap.), Rosario, Cordoba, La Plata, Tucuman. Buenos Aires and Bahia Blanca are best harbors. Language is Spanish. Primary and secondary education are free; former obligatory for children from six to fourteen. Army is a national militia; service compulsory. There is a small navy. Roman Catholicism is the state religion; all others tolerated.

Communications.—There is a coastline of about 2,700 m.; Parana and Uruguay are navigable for many hundred miles. Railways open c. 22,000 m. Trans-Andine railway (opened 1910) connects Argentine with Chile by Uspallata Pass. Road communication is difficult owing to lack of road metal.

Resources and Production.—In N. are forests of hardwood, invaluable for railway sleepers, and quebracho, used in tanning; here are produced tobacco, jute, ramie, sugar, cotton, castor oil, fruits. In Andes regions are magnificent pine forests. In extreme S. seal-hunting and ice-collecting are carried on. There are many fibre-producing plants. Most economic minerals occur but await development; coal is found. Agriculture and pasture are chief sources of wealth. Large numbers of sheep and cattle are raised; dairying important. Argentine is second wool-producing country in world. Horses, mules, asses, goats, and pigs also raised in large numbers. Chief crops are wheat, linseed, oats, barley, alfalfa, rye, maize; sugar-

cane and fruits also cultivated. Imports include cottons, linens, coal, machinery, iron, beer, silk, cement, motor cars, hardware, foodstuffs, agricultural implements, etc.; exports, animals, wool, hides, frozen meat, butter, sugar, wheat, corn, etc. About one-third of import and one-sixth of export trade is with Great Britain. Pop. 1921, 8,698,516. Immigrants are chiefly Spaniards and Italians; also French, British, and other nationalities.

According to a census taken in 1921 the population of Argentina was then 8,698,516. Presidential elections were held April 2, 1922, amid much popular disorder, resulting in the election of Dr. Marcelo T. de Alvear, the candidate of the Radical Party, and previously Minister to France, who was inaugurated as President the following October. Ramon Gomez was appointed Premier. Trade with the United States had fallen off considerably, the imports in 1922 amounting to a little over \$80,000,000, as compared to \$200,000,000, in 1921, while exports in 1922 were \$60,700,000. See MAP SOUTH AMERICA, (So. Part).

ARGON, a gaseous substance in the earth's atmosphere first isolated in 1894 by Lord Rayleigh and Prof. W. Ramsay, after a long series of experiments. Its chemical properties have not yet been ascertained, and it seems to have no chemical affinity of any kind. It forms 0.933 of one per cent by volume of the air and its density is twenty times that of hydrogen. It has been liquified and solidified. Its critical temperature is 179° below zero, Fahrenheit, and at 309° below zero, Fahrenheit, it freezes.

ARGONAUTS (classical myth.), a band of heroes who sailed with Jason in the ship *Argo*, to Colchis, to recover the *Golden Fleece*, which was guarded by a sleepless dragon. The venture proved successful, through the aid of the king's dau. Medea, who became the wife of Jason.

ARGONNE, FOREST OF, plateau of N.E. France (47°-49° 22' N., 4° 50'-5° 10' E.), between the Aisne and its trib. the Aire, is a long low ridge of clay, about 30 m. long and 8 m. wide. No other part of France is so thickly wooded (oak and beech), and in its deep recesses wolves still lurk; crossed by two main roads, Ste. Menesould to Clermont and Vienne to Varennes, and by railway from W. to E.

Fighting in the Argonne.—In the World War this difficult country was the scene of much fighting during the trench warfare. After the first battle of the Marne (Sept. 1914) the Germans took up a defensive line on both sides

of the forest between Vienne and Varennes. Subsequently the French lost some ground, but 'nibbled' it back (Oct. to Dec. 1914). In June to July 1915 the Germans undertook an offensive movement, but a French counter-offensive checked it. In the final Allied advance in 1918 the task of clearing the Argonne was entrusted to Amer. troops, who had a fortnight's hard fighting before they emerged from the N. end of the forest and captured Grand-pré on the riv. Aire (Oct.-16). See **MEUSE-ARGONNE, BATTLES**.

ARGOS (37° 37' N.; 22° 48' E.), town, E. Peloponnesus, Greece; acropolis, ancient theatre. A. in ancient times was predominant Hellenic state in Greece, power extending over most of Peloponnesus in VIII. cent. B.C. under ruler Phidon; a Doric city, famed for cult of Hera, whose temple, Heraion, stood on hill between A. and Mycenæ. In the long struggle between A. and Sparta, the latter ultimately attained ascendancy, c. 500 B.C. After various wars and alliances A. joined Achaean League, 229 B.C., to which it adhered until Roman conquest, 146 B.C.; prospered under Romans; held by Franks for time in XIII. cent.; burnt by Turks, 1825; modern town is straggling place, chiefly agricultural. Pop. c. 10,000.

ARGOSY, poetic name for a ship carrying a rich cargo, derived originally from vessels sailing from the Adriatic port of Ragusa (sometimes spelled Argosa).

ARGUS (class. myth.). (1) Son of Inachus; had a hundred eyes; guardian of Io; slain by Hermes (Mercury). His eyes were afterwards transferred by Hera (Juno) to the tail of the peacock, a bird which was sacred to her. (2) The builder of the ship *Argo*. (3) A dog belonging to Odysseus, which knew him after an absence of twenty years.

ARGYLL, EARLDOM AND DUKE-DOM OF, honors borne by the Campbells of Loch Awe, Lord Colín C. being cr. 1st earl (1457); 2nd earl was killed at *Flodden*; 4th earl (d. 1558) was distinguished as being amongst the earliest of the Scot. peers to adopt principles of the Reformation; 5th earl (1530-73) was a Lord of the Congregation, notorious as being implicated in the Darnley murder, and became Chancellor under Regent Morton. Archibald C., 8th earl (1598-1661), was cr. marquís in 1641; noted for his seriousness of character and religious zeal, and though attached to Charles I. took the side of the Covenanters, raised an army, and was defeated by Montrose (q.v.) in 1644. He was

opposed to the execution of Charles I., supported the cause of Charles II., but subsequently made his submission to Cromwell, for which he was called to account at the Restoration, condemned, and beheaded at the cross of Edinburgh. This marquís is dealt with in *Scott's Legend of Montrose*. The 9th earl (1629-85) was executed for participation in Monmouth rebellion; 10th earl (1651-1703), cr. duke (1701), actively promoted Revolution (1688); and was notorious for his association with massacre of Glencoe. John, 2nd duke (1678-1743), cr. Baron Chatham and Earl of Greenwich (1705) for distinguished services under Marlborough, led Royalist troops against Jacobites at Sheriffmuir (1715), and was cr. Duke of Greenwich (1718); dealt with in *Scott's Heart of Midlothian*.

ARGYLLSHIRE (56° 20' N.; 5° 30' W.), county, W. Scotland; besides irregularly shaped part of mainland, includes Mull, Islay, Jura, and many other islands; surface mountainous; highest peak, Ben Cruachan; coast-line deeply indented by arms of sea—Loch Long, Loch Fyne, Loch Linnhe, etc.; chief inland lake, Loch Awe; capital, Inveraray; largest towns, Campbeltown, Dunoon, Oban; Crinan Canal (opened 1801) connects Ardrishalg with Crinan; fine moors and deer forests; Highland cattle bred, sheep largely raised; quarrying, fishing, distilling. A. was held by independent princes till 1222, when became sheriffdom; after struggles between rival great families, Campbells became supreme and have held earldom (later dukedom) of Argyll since 1457; other important family, Macdonald of the Isles. Area, 3,110 sq. miles. Pop., 1921, 76,862.

ARIADNE (classical myth.), dau. of Minos, king of Crete, who, when Theseus was confined in the labyrinth for the purpose of slaying the Minotaur, gave him a clue to its mazes. After his escape Theseus married Ariadne, but eventually abandoned her in the isle of Naxos.

ARIAN CONTROVERSY. See **ARRUS**.
ARICA (18° 28' S., 70° 20' W.), town, Tacna, Chile; port for Bolivia.

ARIEGE, dep., France (42° 54' N., 1° 30' E.); extends up N. slope of Pyrenees; forests, cereals, fruit; iron, lead, mercury, copper, manganese. Area, 1,893 sq. m.; pop. 200,000.

ARIEL, satellite of Uranus.

ARIES (the Ram.), constellation marking first sign of Zodiac (q.v.), symbolized by T. The point where the sun, passing through the intersection of the

plane of the earth's equator and the *ecliptic* (the plane of its revolution round the sun), crosses from south to north of the equator formerly marked its entry into A., and was called the *First point of Aries*, or the *Spring Equinox*. It was used as the zero line of celestial measurements. The other point of intersection of these two planes, through which the sun crosses from north of the equator to south, is the *Autumnal Equinox*.

ARIL, an additional coat, usually partial, borne by some seeds. An outgrowth from either the ovule stalk, the placenta, or the ordinary seed coat; serves various purposes in accordance with its form.

ARIMATHÆA, tn.; Palestine, mentioned in Bible (Matt. 27:57 f.); site now unknown.

ARIOSTO, LUDOVICO (1474-1533), Ital. poet; b. Reggio, in Lombardy; studied law (which he disliked) for five years, but subsequently devoted himself to literary composition. Some of his early work in the comic vein attracted the attention of Cardinal d'Este, who took the young poet into his service, but rewarded him only with a beggarly pittance. Later he transferred his services to the cardinal's bro., the Duke of Ferrara, and became governor of Garfagnana for three years; afterwards returned to Ferrara. A. is chiefly remembered for his immortal epic, *Orlando Furioso*, which he grafted on to an earlier attempt at epic-writing by Boiardo, entitled the *Orlando Innamorato*.

ARIOVISTUS, Ger. chief, defeated by Julius Cæsar, 58 B.C., near Belfort.

ARISTARCHUS OF SAMOTHRACE (c. 150 B.C.), most famous of Gr. grammarians and a founder of textual criticism; famous for his exhaustive labors in ridding the poetry of Homer of interpolations, to which we owe the text as we possess it.

ARISTIDES, THE JUST (c. 530-468 B.C.), Athenian statesman; strategist at *Marathon*; chief archon (489), ostracized for opposing Themistocles' naval policy (c. 484); distinguished himself at *Salamis* and *Platoea*; commander of fleet (477); as result of probity died poor.

ARISTIPPUS OF CYRENE (430-360 B.C.), Gr. philosopher, founder of Cyrenaic school; a pupil of Socrates, whose utilitarianism he developed into an acknowledged Hedonism; though a pleasure-seeker, was distinguished by fortitude under trial.

ARISTOBULUS (IV. cent. B.C.).

Gk. historian; intimate companion of Alexander the Great; wrote a history of his campaigns.

ARISTOCRACY, term used by Aristotle to mean 'the rule of the best'; hence, *right* government by a small privileged class. The term in modern English is used in reference to members of the peerage, a limited number of whom have hereditary seats in the House of Lords, and thus take part in the government of the country. The mediæval republics of Venice, Genoa, and other places in Italy may be cited as examples of government solely by the patrician class.

ARISTOLOCHIACEÆ (birthworts), family of dicotyledons comprising about six genera and 250 species, distributed over the warmer regions of the world except Australia; many have medicinal properties.

ARISTOPHANES (455-375 B.C.); the greatest comic poet of Greece; was an Athenian citizen; s. of Philippus, a landowner, in Egina. Upwards of fifty comedies are ascribed to A., but of these only eleven are extant; *The Acharnians* (425), *The Knights* (424), *The Clouds* (423), *The Wasps* (422), *The Peace* (421), *The Birds* (414), *The Lysistrata* (411), *The Thesmophoriazusoæ* (411), *The Frogs* (405), *The Ecclesiazusoæ* (393), and *The Plutus* (388). In politics the poet held conservative views and was strongly antagonistic to the democratic school of thinkers represented by Socrates and Euripides. His plays were often made the medium of his opinions, and through them he gave expression to his brilliant powers of wit, humor, and invective. His plays are further distinguished by originality of plot, cleverly planned situations, and graceful and vigorous dialogue, while it is held by some distinguished critics that the poet achieved his highest success in the exquisite lyrics which are interspersed through them.

ARISTOTLE (384-322 B.C.); one of the greatest thinkers of history; b. Stagira, Macedonia, whence known as the *Stagirite*. Losing both parents while still young, Aristotle came to Athens, where he joined Plato's school; remained in Athens twenty years; on death of Plato, migrated to Atarneus in Mysia, where he married Pytheas, the adopted daughter of Prince Hermias. In 342 Aristotle became tutor to Alexander, afterwards the famous general. Returning, in 335 B.C., to Athens, he taught philosophy in the walks of the Lyceum (whence the name Peripatetics given to his followers); accused of impiety.

he withdrew to Chalcis in Euboea, where he died in the following year.

The writings of Aristotle, which are almost wholly the MSS. of lectures posthumously edited by pupils, deal with almost all the branches of knowledge known to his age, and give a sketch of a complete system of the sciences. These are classed as theoretical (logic, metaphysics, and physics), practical (ethics, economics, politics), and productive (rhetoric and poetry.)

ARITHMETIC, the science treating of numbers and calculations. Numbers are expressed by means of certain signs or symbols. These are, in the very great majority of cases, figures; occasionally the capital letters I, V, X, L, C, D, M are used. Calculations are always made with figures. The basis of all calculation is the unit 1, one. A number is a unit, such as *one penny*, or a collection of units of the same kind, as *seven horses*. A number, such as *four* or *five*, not attached to any particular things or units, is called an *abstract number*. A number of particular units, such as *four pigs* or *five geese*, is called a *concrete number*.

Figures, or *digits*, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, represent respectively *nought*, *one*, *two*, *three*, *four*, *five*, *six*, *seven*, *eight*, *nine* units. Each denotes one unit more than the preceding one.

The letters used to denote numbers are: M, a thousand; D, five hundred; C, one hundred; L, fifty; X, ten; V, five; and I, one. Since we have only the figures 0, 1, 2, etc., to represent all numbers, it is necessary to give a *place value* to the digits—i.e., to make the value of a digit depend upon position as well as upon the symbol. The method was known in Europe to some extent about the 12th cent., and it is fairly certain that one of its avenues of approach was through the Moors.

A figure in the first place—i.e., the right-hand place—of a number denotes so many units. The same figure in the second place denotes 10 times as many. Hence, figures in the second place are often called *tens*. The same relation holds for all successive places, the *place value* of any one place being 10 times that of the one immediately to the right of it.

Each place has a place name, which corresponds with its place value; thus the digit 1 in the successive places from right to left denotes one unit; ten, one hundred, one thousand, ten thousand, one hundred thousand, one million, and so on up to one million million, which is called one billion, and to one million billion, called one trillion. In France and the U.S. a billion denotes

a thousand million, a trillion a thousand billion, and so on.

The number 10, which is so important in the system of numeration, is called the *radix* or the *scale of notation*. Other systems with different *radices* have been employed, but no corresponding notation exists.

For further information on systems of notation, see NUMERAL.

(1) *Addition and Subtraction*.—*Addition* is the process of finding a single number equivalent to two or more numbers; *subtraction* is the operation of finding how much larger or smaller one quantity is than another. Addition is denoted by the sign + (plus), subtraction by — (minus), the left-hand one of two quantities being taken first and the next added to, or subtracted from, it. Thus $12 - 5$ means we are to take 5 from 12.

Addition or subtraction usually involve rearrangement. Only quantities of the same kind can be added or subtracted.

Subtraction may be performed in one of two ways, based on (i.) What must be added to a given number to make another? or (ii.) By how much must a given number be diminished so as to equal another?

(2) *Multiplication* is a contracted form of addition and is denoted by the sign X. The result is known as the *product*. In multiplication it is better to deal with the left-hand digits first, as these are the most important. The development of physical science has emphasized the impossibility of ever obtaining absolute accuracy, so approximations are all we are ever justified in obtaining. It is just as easy to perform the ordinary process of long multiplication from left to right as from right to left, and the facility thus obtained is of considerable value when contracted methods of multiplication of decimals are reached. Multiplication is performed with the aid of multiple tables giving successive multiples of a particular unit.

(3) *Division*, denoted by the sign ÷, is the operation of ascertaining how often one quantity is contained in another. A concrete quantity may be divided by another like quantity. A concrete quantity may be divided by an abstract number; or an abstract quantity may be divided by another. In any case the result is known as the *quotient*.

(4) *Factors*.—The factors of any number are such numbers as are integral parts of the number, no remainder being left on division. A number which has no factor other than itself and unity is called a *prime number*. The first few

primes are 2, 3, 5, 7, 11. A knowledge of the prime factors of numbers is of much use in the processes of finding the *Least Common Multiple* and *Highest Common Factor* of several numbers; e.g.—

$$\left. \begin{array}{l} 24 = 2 \times 3 \\ 15 = 3 \times 5 \\ 36 = 3 \times 2 \end{array} \right\} \therefore \text{L.C.M. of } 24, 15, 36 = \begin{array}{l} 3 \times 5 \\ \text{and H.C.F.} = 3; \\ \text{where } 2^2 \text{ denotes } 2 \times 2 \\ \text{and generally } a^n - a \times a \\ \times a - \text{to } n \text{ factors;} \end{array}$$

for the L.C.M. is the product of the highest powers of all the primes which occur, and the H.C.F. is the product of all factors common to the set of numbers.

(5) *Fractions and Decimals.*—A quantity being divided into any number of equal parts, one or more of such parts is a *fraction* of that quantity. Thus $\frac{1}{16}$ of 1 cwt. denotes that 1 cwt. is to be divided into 16 equal parts, and 3 of these taken. A fraction of a fraction is obtained from the principle that the value of a fraction is unchanged when both numerator and denominator are multiplied or divided by the same number. Thus to find $\frac{1}{2} \times \frac{1}{4}$ of X, we have $\frac{1}{2}$ of X = $\frac{1}{2} \times \frac{1}{4}$ of X, and taking as a new unit $\frac{1}{8}$ of X, 4 times which is $\frac{1}{2}$ of X, we see that this must be taken 5 times instead of 4. Addition and subtraction of fractions giving the result $\frac{1}{2} \times \frac{1}{4}$ of X $\frac{1}{8}$ of X. is performed by reducing them all to a *common denominator*; it is usual to take for this the L.C.M. of the denominators.

In the *decimal notation* the system of place value is extended beyond the units figure. Thus 5.164 means 5 units, 1 tenth, 6 hundredths, 4 thousandths, or $5 \times \frac{1}{1000}$. The manipulation of decimals is thus exactly the same as for ordinary integral numbers, only the position of the decimal point giving difficulty. Multiplications and divisions are best performed by the contracted methods, the position of the decimal point being afterwards fixed by a rough approximation.

(6) *Approximation.*

(7) *Percentages* may be regarded as decimal fractions, the denominator in every case being 100. Thus $\frac{3}{4}$ is equivalent to $\frac{75}{100}$ or 75 per cent. In many cases only approximate values can be given, as $\frac{1}{2} = .571428 \dots =$ approximately 57 per cent. But by using mixed fractions we may write $\frac{1}{2} = 57\frac{1}{2}$ per cent. = .57 $\frac{1}{2}$.

(8) *Ratio* is concerned with the relative magnitude of quantities. *Proportion* deals with equality of ratios.

(9) *Special Applications.*—For information on Interest and Discount, etc.,

reference should be made to any textbook on commercial arithmetic.

ARIUS (d. 336), famous heresiarch; presbyter of Alexandria; from him Arian controversy took its name, though doctrines he promulgated were not entirely new, being similar to those of Lucian of Antioch and Paul of Samosata. According to A., the Son was a created being, hence not in orthodox sense 'perfect God'; the Logos was united with a human body, hence Christ's humanity was not real either. A. was excommunicated, 325, at Council of Nicæa, his heresy lived on till VII. cent.

ARIZONA (Ind. Sp. meaning 'few springs' or 'silver bearing'), a state of the Union, N. America, situated between Utah on the N., New Mexico on the E., Mexico on the S., and California and Nevada on the W. It ranks fifth among the U.S. with a gross area of 113,020 sq. m., 100 sq. m. of this being water. The state is divided diagonally into two parts by the Mexican Cordilleras. The northern region consists of a plateau, broken by high mountains, which in the San Francisco Range attain a height of over 12,700 ft. In the S. and S.W. are wide, desert plains watered by the Salt and the Gila Rs. The Colorado and its tributary, the Little Colorado, water the N.W. region. The annual precipitation ranges from 1-10 in. in the W. and from 10-25 in. in the E. Few crops are grown without irrigation in the lowlands, the climate being dry and clear, suitable for astronomical observations, and the soil unproductive. Several large reservoirs have been constructed, the most notable being the Roosevelt dam. The most important crop is alfalfa, but wheat, barley, corn, etc., and semi-tropical fruit are also cultivated. Farming is carried on to a great extent. Cattle and sheep are reared on the pasture lands, and the forests (13,668,366 acres) provide good timber. The state is rich in mineral deposits, the greatest output being in copper, gold, silver, and lead, while granite, limestone, asbestos, and quicksilver are also worked in the state. The chief industry is the smelting and refining of copper, the value of its products amounting to \$20,585,000 in 1921. In the production of Copper Arizona ranks first among the states. Enormous subterranean caves, rivaling the mammoth caves of Kentucky, were discovered in 1909. The country was discovered by Marcos de Niza, a Spaniard, in 1539, rumors of its wealth having reached Spain through the explorer, de Vaca. In the following year Vasquez de Coronado explored the country, but the earliest settlements were made by Spanish missionaries at Tucson and

Tubac about 1772. Arizona remained under the influence of Spain till 1821, when it achieved its independence. In 1848 it was ceded to the U.S.A., and was organized as a territory in 1863, becoming a state of the Union on Feb. 14, 1912. Its population in 1920 was 334,162. The capital is Phoenix (pop. 1920, 29,053). Other cities of importance are Tucson (20,292), Bisbee (9,205), Globe (7,044). See MAP UNITED STATES.

ARIZONA, UNIVERSITY OF, a State institution created by an act of the legislature, in 1885, and opened in 1891, at Tucson. Over half a million dollars are represented in its buildings and equipment. Each year the state appropriates about \$120,000 to its maintenance, the Federal Government donating \$50,000. It has a library of 25,000 volumes, a faculty of 70 and a student body of about 1,200. The departments are Agriculture, Electrical, Mechanical and Mining Engineering, Commerce, the Liberal Arts and Economics.

ARK (Lat. *arca*), in Old Testament the bulrush basket in which the child Moses was found; Noah's ark (300 cubits long, 50 broad, 30 high); also 'Ark of the Covenant,' the sacred chest (containing the tables of stone, etc.) carried by the Israelites into Palestine.

ARKANSAS, the 'Bear State,' a S.-central state of the U.S.A., bounded on the N. by Missouri, E. by the R. Mississippi, S. by Louisiana and Texas, and W. by Texas and Oklahoma. The surface of the state is very varied. It may be divided about equally into the N.W. highland division and the S.E. lowland division. Out of the broad alluvial bottoms of low elevation which border the Mississippi R. and its chief W. tributaries rise the Costal Plains, which extend N.W. to the Boston Mts. belonging to the Ozark Uplift. The Mississippi forms the E. border, while its chief tributary, the Arkansas, bisects the state from W. to E. Other important rivers are the St. Francis and White Rs. to the N., and the Saline, Ouachita, and Red Rs. to the S. The climate is pleasant and healthy, except in the malarial swampy district of the E. The normal rainfall is from 45-55 in., but even this is not sufficient for the rice fields, which have to be flooded through artificial means. Agriculture is the chief industry. There are large deposits of bituminous and semi-anthracite coal. The growth of manufactures has been considerable, the most important branch being the lumber and timber industry, which includes logging operations, planing mills, sawmills, etc. There are good railroads, except in the mountainous

districts of the N. and W., the chief being those which connect the cities of the N.-central states with the Gulf cities on the S. There are natural hot springs, world-famed as a cure for rheumatism and kindred ills, and the town of Hot Springs (11,695) has sprung up beside them. A. was visited by the Spaniard, De Soto, in 1541, but the first settlement was made by Frenchmen at Arkansas Post in 1686. The Mississippi was explored further by Marquette and Joliet (1673) and La Salle (1682), and the territory, after passing through French and Spanish hands, was purchased by the U.S.A. in 1803. A. was erected into a territory in 1819 and admitted as a state into the Union in 1836. Its pop. 1920, was 1,752,204. The chief cities are Little Rock (65,142, the capital), Fort Smith (28,870), Pine Bluff (19,080). See MAP UNITED STATES.

ARKANSAS CITY, a city in Cowley County, Kansas, fifty miles southeast of Wichita, on the Arkansas River, near a canal uniting it with the Walnut River, and on the Achison, Topeka & Santa Fe, the Missouri & Pacific and the St. Louis & San Francisco Railroads. It has prospered of recent years largely on account of the proximity of the oil fields, but it has also a number of important manufactories, which turn out wind mills, agricultural implements, flour, lumber, etc. Since 1912 it has established a commission form of municipal government. Pop. 1920, 8,500.

ARKANSAS RIVER, trib. of Mississippi, rises in high mts. of Central Colorado, enters main river (33° 47' N., 91° 3' W.) Drainage area, 185,670 sq. m. Length over 2,000 m.

ARKANSAS, UNIVERSITY OF, a state institution founded in Fayetteville, 1871, devoted to the liberal arts, sciences, engineering and agriculture. Its annual income is about \$125,000 a year. Its library has about 30,000 volumes. The professors and instructors number about 70 and the student body about 850. Within recent years medical and law departments have been added and are established at Little Rock, while a normal school for Negroes has been established at Pine Bluff.

ARKONA, OR ARCONA. (1) Cape, Rugen I., Baltic Sea, Germany (54° 40' N., 13° 26' E.); lighthouse; ruins of fortress. (2) Settlement, Canada (43° 12' N., 81° 48' W.).

ARKWRIGHT, SIR RICHARD (1732-92), Eng. inventor; b. Preston; apprenticed to barber, but took great interest in machinery used in the manufacture of cotton cloth; invented the spinning-

frame, and made other improvements in processes of carding and spinning. With help of two wealthy partners he established mills at Nottingham, and at Cromford (Derbyshire), and amassed large fortune; knighted by George III. in 1786.

ARLES (43° 40' N., 4° 38' E.), river port, on Rhone, France; has ruined Rom. amphitheater, and theater where *Venus d'Arles* was discovered; fine cathedral; various synods held here from 314 A.D. onwards. Pop. 16,200. Arles, Kingdom of, dated from 933 till about 1378, when its independent history ended; included Lyonnais, Franche Comté, and district between Rhone and Alps.

ARLINGTON, a city in Middlesex County, Mass., forming a residential suburb of Boston, about seven miles northwest of that city and on the Boston & Maine R. R. Numerous flower and vegetable gardens are located here for the supply of Boston, but some independent industries are also included, chief of which are piano and wire factories. Pop. 1920, 18,665.

ARLINGTON, HENRY BENNETT, EARL OF (1618-85), Eng. statesman; sec. to Lord Digby (1643); member of Cabal (q.v.); fought for king during Civil War; knighted (1657); Charles' agent in Madrid till after Restoration. He became Sec. of State (1662); Baron A. (1663); Postmaster-General (1667); intimately connected with Dover Secret Treaty (1670); earl (1672); Lord Chamberlain (1674); Lord Lieutenant of Suffolk (1681). Agreeable but egotistical, A. was a typical Restoration statesman.

ARLISS, GEORGE (1868), an English-American actor, b. in London, England. He made his professional debut at the Elephant and Castle Theater, in London, at the age of nineteen, but did not become widely known until he toured the United States with Mrs. Patrick Campbell, in 1901. In the year following he played opposite Blanche Bates in 'Zakkuri', and in 1908 he played the Devil in the play of that name with Mrs. Fiske at the Belasco Theater, in New York City. His popularity, however, rests on his title role in the play 'Disraeli', first produced in 1911, but in which he appeared for years afterwards. He has also written a number of plays, among them *Widow's Weeds*, and *There and Back*.

ARM. The upper limb consists of proximal part or shoulder, a distal part or hand, and an intermediate shaft

made up of an upper arm and forearm. The bones are: in the shoulder, the clavicle (collar-bone) and the scapula (shoulder-blade); in the upper arm, the humerus; in the forearm, the radius and ulna; in the hand, the carpal and metacarpal bones and the phalanges.

ARMADA, THE (1588), fleet sent against England by Philip II. The commander (Duke of Medina Sidonia), was inexperienced; ships unwieldy and undermanned; gunnery inferior; and the provisions scanty. Eng. fleet, planned with view to naval battle, under Admiral Howard (Drake, Frobisher, Hawkins—subordinate admirals), finally routed the Spaniards; destruction completed by storms. Failure of A. represented Philip II.'s failure to make Roman Catholicism and Hapsburg dynasty supreme.

ARMADILLO, family of Central and S. American edentate, omnivorous, chiefly nocturnal mammals, provided with armor of bony plates and strong claws for burrowing; length up to 4 ft.; fossil species, some of immense size, found in caves. See EDENTATA.

ARMAGEDDON, the scene of final conflict between powers of good and evil (Rev. 16 : 16). The Great War was commonly so called. The scriptural reference is to Megiddo on plain of Esdraelon, and this place was the scene of the final discomfiture of the Turk forces during Allenby's campaign; the armistice which followed was the first step in the series of surrenders which ended the Great War.

ARMAGH (54° 16' N., 6° 35' W.), county, Ulster, Ireland; area, 312,658 acres; rises to height of about 1900 ft. in S. (Slieve Gullion), but is elsewhere flat with good deal of bog; has good railway communications; linen and cotton-weaving; chief rivers, Bann, Blackwater, Newry, Callan. Pop. 120,000.

ARMAMENT, LIMITATION OF. See CONFERENCE ON LIMITATION OF ARMAMENTS.

ARMATURE, OF DYNAMOS. Armature is a French term, meaning armor originally from its Latin derivation. It is applied to a bar or piece of soft iron connecting the poles of permanent or electric magnets, which are then said to be armed. More specifically, an armature is a core of metal surrounded by a coil of wire or other conducting medium, rotating near the poles of a magnet in a dynamo-electric or a magnet-electric machine. Some varieties of dynamo-armatures are named from

their shape, such as cylindrical, drum, girdle, or spherical armatures; or from their construction or winding, such as disk, multipolar, polarized, ring, shuttle or unipolar armatures. Applied to a permanent magnet, an armature is also known as a keeper, as it preserves the magnetism when not in use. Thus utilized, the armature itself becomes a magnet with reversed poles, so operating on the particles of the permanent magnet that they remain in a state of active magnetic tension. Horseshoe magnets are never laid aside without their protecting armatures. Straight-bar magnets have two placed parallel with poles reversed; they thus have a keeper or armature sustaining their magnetic force at each end. Armatures are also useful parts of telegraph sounders.

ARMED MERCHANTMEN, the name given to cargo and passenger vessels mounted with defensive guns against the depredations of German submarines during the European War of 1914-18. The wholesale destruction by Germany of commercial shipping on the high seas, especially that of neutrals, was a determining cause of bringing the United States into the conflict, as America's commerce suffered no less than others. Germany's attacks on allied and neutral shipping were intensified when her submarine commanders found that a vessel was armed. She held that such craft, by mounting guns, had deprived themselves of the privileges of non-combatants, and could legitimately be sunk as war vessels without warning, regardless of the safety of passengers. A number of armed vessels met this fate. Germany's defense was that if her submarines did not act quickly, they would themselves be sunk by the guns of the armed merchantmen they encountered. Germany herself was to blame for the appearance of guns on such craft. Her submarine edict early in 1917 condemned to immediate destruction all allied or neutral shipping found in a naval war zone she mapped out, and merchantmen of all affected countries accordingly began to mount defensive guns. Several gave good accounts of themselves in holding off and sometimes in sinking German submarines.

ARMENIA, dist., W. Asia, divided between Turk. vilayets Erzerum, Van, etc., Russian governments of Erivan, Elisavetpol, and Tiflis, and part of Pers. prov. of Azerbaijan (c. 39°-42° N., 38°-47° E.). Surface is series of pastoral plateaus from 3,000 to 7,000 ft. above sea-level; highest point, Mt. Ararat (17,325 ft.); drained by Euphrates, Kur, Aras, Tigris. Climate severe; cold

N. winds; valleys have vineyards and orchards, produce cotton, tobacco, maize, rice, hemp, flax. Minerals include copper, silver, lead, iron, arsenic, alum, rock salt.

History.—Armenia was in early times successively subject to Assyria, Media, Persia; conquered by Lucullus, 69 B.C.; divided between Rome and Persia, A.D. 387. In 632 was united to Byzantine empire; subsequently came under caliphs, under whom was established Bagratid dynasty; seized by Seljuk Turks in 11th cent. After various vicissitudes Armenia was divided between Turkey and Persia in 16th cent., Russia acquiring share in 1828. Later in 19th cent. revolutionary societies were formed; result of movement was massacre of Armenians by Turks in 1894, and subsequently at various dates down to 1920, making figures of pop. unreliable. These massacres, known as Armenian atrocities, have from time to time formed subject of negotiations with Turkey, and in March 1920 of a sharp note to the Porte (see **TURKEY**), followed by the Allied occupation of Constantinople. By Peace Conference, Armenia to be independent state under Allied protection. Cap. Erzerum; port, Trebizond.

Campaign in Armenia.—When Turkey went to war (Nov. 1914) on the side of the Central Powers, Russia began a campaign against her on the Caucasian frontier. Russian columns advanced from the railroad at Sarikamish, and on Nov. 20 reached Kopri-Keul on the road to Erzerum. While the Turkish 11th Corps held up the advance, the 9th and 10th, together with the 1st, which had been brought from Constantinople by sea, executed a flank move on the left against the Russian communications; but the Russians got notice of Enver Pasha's bold plan and proceeded to defeat it in detail (Jan. 1915). Each corps was severely defeated in turn, and pursued across the mountain tracks. One Russian column moved from Ardahan through the passes, while another, supported by the Black Sea Fleet, operated along the coast from Batum. Meantime, desultory fighting with Ottoman forces and local banditti continued in the region between Lakes Van and Urumiah. In April a general advance began. The city of Van was taken on May 19, and a Turk. corps moving to its relief was intercepted and practically annihilated on June 4. During the remainder of the year fighting was of a local nature, the Russians being deeply engaged on their main European front. In September the Grand-duke Nicholas became viceroy of the Caucasus, with General Yudenitch, who had been mainly responsible for the victories

of Sarikamish and Ardahan, as his chief of staff. A Russian offensive was hastened by reason of the Allied evacuation of Gallipoli. As the result of a great converging attack Erzerum was captured on Feb. 16, 1916, after the Russian Siberian Division by brilliant forced marching had penetrated the defense on the N. of the city behind the main forts on the Deve Boyun ('camel's neck') ridge. Besides great quantities of stores, 235 officers and 12,753 unwounded men were taken prisoners, and the Turk. casualties were over 60,000. Mush was occupied on Feb. 19, and Bitlis on March 3. Before pressing on directly to Erzingian, Yudenitch had to clear his flanks. Landing a column on the coast a short distance E., he captured Trebizond on April 18, while on the left he pushed on to Diabekr. Turk. reinforcements, however, were coming from Gallipoli, and there was much hard fighting before Erzingian was taken on July 25, 1916. A counter-attack was promptly launched from the S. and the Russian flank was driven in, losing Mush and Bitlis. On Aug. 18 the Russians again attacked, and retook Bitlis and Mush (Aug. 25). With this action the campaign practically came to an end. Brit. pressure from Egypt and in Mesopotamia compelled the Turks on the Armenian front to remain on the defensive. Then the Russians had to withdraw units to reinforce their tottering European front, and with the coming of the revolution (March 1917) their armies melted away. Prvejalsky, Yudenitch's successor, concluded an armistice after the Turks had recovered Trebizond and Erzerum. By the Treaty of Peace (May 1920) Turkey recognizes Armenia as a free and independent state, accepts arbitration of Pres. of U.S. as to frontiers, etc.; falling a direct agreement, separate treaty to be signed by Armenia protecting racial, linguistic and religious minorities, and safeguarding freedom of transit and equitable treatment for commerce of other nations.

The Armenian Republic of Erivan constituted in the territory comprising the southeastern part of Trans-Caucasia in 1919, was recognized as an independent nation by the Allies, in January, 1920. Its independence was recognized by the treaty of Sévres, which was signed by the Armenian Republic, along with other powers. The Republic, in 1921-2, suffered not only from famine but from war. In April, 1921, Armenia became a Soviet republic and was in close relation with the Soviet republic of Russia.

The military operations carried on in

Turkish Armenia by the Greeks and Turks resulted in the killing of thousands of Armenians and the abandonment of their homes by hundreds of thousands of others. The number of Armenian refugees from Turkish Armenia was more than 600,000. Nearly 300,000 of these fled to the Armenian Republic, and in the cities were concentrated over 400,000 refugees from all parts of Anatolia. There were many massacres of Armenians throughout Asia Minor, during 1921-2. A portion of the territory claimed by Armenia was taken away by a treaty between the Angora or Turkish government on the one hand, and the Soviet republics of Armenia, Azerbaijan, Georgia, and Daghestan on the other, which was signed on October 13, 1921. This conceded to the Turks about half of Caucasian Armenia and extensive regions of Georgia.

Armenian Language and Literature.—The old Armenian language, which is the medium of the country's literature, belongs to Indo-Germanic group, and somewhat resembles ancient Greek. This may perhaps be explained by the fact that after the conversion of the Armenians to Christianity (A.D. 300) Gr. language and literature became objects of special study, and at a somewhat later date use of the Gr. alphabet became general in western Armenia. The translation of the Bible was undertaken in 5th cent. by St. Mesrob and Sahak the Great, and about same time translations were made of the *Chronicle* of Eusebius, St. Chrysostom's *Homilies*, the *Discourses* of Philo, and other notable works. This literary language, however, is no longer a living tongue; modern Armenian divided into several dialects, marked by considerable admixture of Turk. and Pers. words.

Armenian Church.—Christianity penetrated Armenia from Syria, probably in early part of 3rd cent., but details are unknown. All is obscure till Gregory the Illuminator, the real founder of Armenian Christianity, began his work about 261, and baptized King Tridates. The Armenian Church has always been national, and has several peculiarities. As regards doctrine, like the other Eastern Churches it rejects the *filioque*, asserting the Procession of the Holy Spirit from the Father only, not from the Father and Son, and like the Coptic and Abyssinian Churches Armenians refuse to accept Chalcedonian definition of the person of our Lord, saying they are Monophysite, admitting only one nature. In ritual they have still maintained pagan sacrifice of animals, which they practise on the great festivals. The Armenian Church as a whole did not admit the supremacy of the Roman

See, but since the 14th cent. there have been definitely organized Armenian Catholics. See MAP EUROPE.

ARMENIAN MASSACRES, the territories in Asia Minor inhabited by Armenians have, from the earliest domination by the Turks, suffered repeated massacres and other atrocities. The most ferocious and devastating of these have occurred in recent times. In 1894-96 there was a series of massacres in which thousands of Armenians perished. The great powers forced the Sultan to accept a scheme of reforms, but in spite of this the murders continued. In the various outbreaks during these years it is estimated that 80,000 people have perished. Among these were several American missionaries.

When Turkey entered the World War a systematic extermination of Armenian people was begun under the direction of Enver Pasha. It was reported by the American Committee for Armenian Relief, in 1916, that between 600,000 and 850,000 Armenians had been killed or perished from privations. Viscount Bryce made an exhaustive report of these outrages which reveals the studied efforts of the Turks to wipe out the Armenian people. This policy of extermination was steadily pursued during 1915 and a general order for the deportation of every Armenian to Mesopotamia was sent by the Turkish government to every province in Asia Minor. Over 200,000 of the Armenian population contrived to escape to the Caucasian borders and finally took refuge in Russia. It was estimated by Lord Bryce that four-fifths of the entire nation had been wiped out. He added 'there is no case in history, certainly not since the time of Tamerlane, in which any crime so hideous and upon so large a scale was recorded. The Armenian atrocities have been called, truly, the "blackest page of modern history."

After the conclusion of the World War the Treaty of Sèvres made provisions for the protection of minorities under the Turkish rule. This included the Armenians and for a short space of time they were free from violent executions. The Turkish Nationalists under Mustapha Kemal, however, refused to recognize the terms of the treaty and in the war with Greece in Asia Minor which followed, from 1920 to 1922, the Armenians were again exposed to the fury of the Turks. In spite of the protests of foreign governments, these massacres continued until it was estimated by the beginning of 1923, that only 500,000 Armenians remained. The Turkish officials at the conference at Lausanne,

held in 1923, proposed the removal of the entire Armenian population to Thrace, and this was virtually agreed to by the Great Powers at the conference.

ARMENTIÈRES, tn.; dep. Nord, France (50° 40' N., 2° 50' E.), on the Lys, near the Belgian border, known by Brit. soldiers as 'Armenteurs'; prior to Great War had important manufactures of cloth and linen. Pop. 28,600. For three and a half years during hostilities it was held by the British. During the 'race to the sea' it was occupied by the Germans, who were driven out on Sept. 16, 1914. In the spring of 1918 it again fell into their hands after a heavy bombardment with gas shells (April 9). For six months the town was well within their lines, and when reoccupied after their final retirement in October hardly a house remained habitable. Early in 1919 railway communications were restored, and reconstruction was begun.

ARMINIUS, HERMANN (17 B.C.-21 A.D.), Ger. national hero, who led the tribes and won victory over Roman gov. Quintilius Varus, in Teutoburger Wald, and later over Germanicus Caesar; eventually murdered by his relations, who became jealous of his power.

ARMINIUS, JACOBUS (1560-1609), Dutch religious leader; studied at Leiden Univ., 1576-82, where he met various able theologians; then at Geneva, Basel, and in Italy. Broad-minded and tolerant, he was too friendly with 'heretics' to satisfy the stern Calvinists of his day; was ordained, 1588; theological prof. at Leiden, 1603-9. His name has passed to the type of theol. which is anti-Calvinistic; Calvin maintained predestination. A. man's freedom—every man could be regenerated and saved if he would. *Life*, by Brandt.

ARMISTICE, agreement for the cessation of hostilities; may be general or local. In practice, three different kinds: (1) suspensions of arms; (2) partial or local armistices; and (3) general armistices. In (1) cessation of hostilities is of brief duration, and is concluded between commanders of armies or of detachments for specific purpose (i.e.) burying dead and collecting or succouring wounded. In (2) operations are only suspended in a fixed considerable zone of the theatre of war (cf. that between Allies and Napoleon in Germany, 1813). (3) A general armistice suspends the entire military and naval operations of the belligerents; it is concluded by the belligerent governments themselves, or by their commanders-in-chief; ratification is always necessary. Armistice of

Nov. 11, 1918, which suspended hostilities with Germany, was concluded by Marshall Foch and Admiral Wemyss with civil and military representatives of Germany; but before any meeting took place, the Allied representatives had received full instructions from the Versailles Supreme War Council, which contained representatives of the Allied governments concerned, while during the negotiations the Ger. representatives were permitted to communicate with their own government. Though armistices merely suspend hostilities without putting an end to the war, in practice a general armistice has always led to the conclusion of a treaty of peace. The armistice of Nov. 1918 was renewed three times before peace was signed, and at each renewal some modifications were made. The Allied and Associated powers reserved to themselves the right to denounce the armistice at three days' notice.

In the terms of armistice a neutral zone is fixed sufficiently wide to prevent any sort of collision between troops. This, in the case of the armistice with Germany, was determined by the rate at which the Germans should retire beyond the Rhine, and the rate at which the Allied troops should advance. The Germans were directed to evacuate the invaded territories, together with Alsace-Lorraine and Luxembourg, within fourteen days, and to retire to a specified W. of the Rhine within a further sixteen days. Between the forces a neutral zone (6 m. wide) was established, and was not to be entered by the armed forces on either side.

A general armistice always includes a definite statement of the terms on which the contracting party who is sued agrees to suspend hostilities. The chief conditions imposed on Germany, in addition to those indicated above, were the surrender of all submarines, 6 battle-cruisers, 10 battleships, 8 light cruisers, and 50 destroyers of the most modern type; 2,500 heavy guns, 2,500 field guns, 30,000 machine guns, 3,000 trench mortars, 2,000 aeroplanes, 5,000 railway locomotives, 150,000 railway wagons, and 5,000 motor lorries. All prisoners of war in Ger. hands were to be repatriated without reciprocity; while the cost maintenance of Allied troops occupying the Rhine lands and Alsace-Lorraine was to be charged to Germany.

ARMOIRE (Fr.), name given to large decorated cupboards, or wardrobes, for containing church vestments, eucharistic vessels, etc. Many fine examples are to be seen in old Fr. cathedrals.

ARMOUR, PHILIP DANFORTH, (1832-1901), Amer. merchant and phi-

lanthropist, founder and head of Armour, Plankinton and Co., pork packers, Milwaukee; transferred business to Chicago (1870). At death had over 50,000 employés on roll. Founded Armour Institute of Technology and Armour Mission of Chicago.

ARMS and ARMOR. The former term includes any sort of offensive and (strictly, in the case of persons only) defensive weapon. Offensive weapons include arms to discharge missiles (*e.g.*) catapults, firearms; missiles (*e.g.*) spears; arms wielded by hand at close quarters for cleaving, thrusting, crushing, cutting (*e.g.*) axes, daggers, clubs, sabres. Arms for the purpose of defence comprise chain mail and metal plates to protect the body, head, and limbs, in addition to shields. Early races used stone weapons; those employed in the earliest (Palæolithic) times were chipped flints and celts, while in later (Neolithic) times more elaborate weapons were used, such as flint knives attached to handles. Various kinds of stone, horn, and bone were used for making weapons; spear-heads and arrow points (leaf-shaped, lozenge-shaped, tanged, and triangular) were chipped in flint, and vegetable fibre and bitumen fastened heads to shafts. Flint daggers (usually 12 in. long) were various in form and size. Short, leaf-shaped daggers and curved knives, with both edges sharpened, were highest type. Sling stones and stone balls (probably used like S. American *bolas*) were also used. Wristlets or braces of slate seem to have been only defensive armor in Stone Age.

Metal was only gradually adopted for weapons; bronze dagger apparently earliest metal weapon. A sword with a long tapering blade and a long handle was a favorite weapon of the Bronze Age. Swords of transition period between Bronze and Iron Ages—generally iron copies of leaf-shaped sword, sometimes having flat bronze handle-plate. The problem of pre-Homeric and Homeric armor is largely a matter of inference; no single type of weapon predominates. According to Homeric poems, fully armed Homeric warrior wore shield, greaves, band, belt, tunic, helmet, breastplate, sword. Hoplites of later Greece wore helmet, breast and back plates, greaves of pliant bronze, round or oval shields, and fought with pikes and short double-edged sword. The heavy armed cavalry carried lances. Intermediate were the peltasts (*peltai* 'small light shield').

Equipment of Roman soldier underwent many changes. Early Roman sword was of bronze, straight blade, double edged, obtusely pointed. About

Polybius' time (160 B.C.) the cavalry, originally protected by light ox-hide shield and fragile spear, adopted Gr. equipment of buckler, breastplate, and strong spear. Later the *pilum* (a form of javelin) became characteristic weapon of the heavy armed. Auxiliaries used the *hasta* and *spatha*. Under the Empire, heavy armed apparently had helmet, cuirass, long sword and dagger, *pilum* and *scutum*. Cavalry had broadsword, buckler, long thrusting pole, and javelins.

The fully armed Eng. knight (11th cent.) had helmet, hauberk, shield, sword, lance (or sometimes axe, mace, and bow). The longbow and the arbalest, or crossbow, were two of the most formidable weapons of the Middle Ages. The Eng. victories at Crécy, Poitiers, and Agincourt were chiefly due to the use of the former weapon, while the French favored the latter, and it continued in use in their army until about 1530. Plate armor appeared in 14th cent. In 15th cent. surcoat and horseman's shield tended to disappear. During trench period of the Great War breastplates, helmets, steel shields, etc., were again used. The *arquebus* was invented in Spain in 16th cent., and was succeeded by the *musket*, a clumsy weapon, fired from a rest. By various stages this developed into the rifle, and then into the modern breech-loading and magazine weapons. The bayonet attached to the rifle still remains the decisive weapon at close quarters. Cannon, first used by the English at Crécy, have now in multifarious forms (field gun, howitzer, trench mortar, etc.) become an all-important factor in modern warfare. The *Machine Gun*, introduced in the second half of the 19th cent., has become a most formidable weapon, capable of developing an intense and rapid rifle fire on a small front. Grenades, first used in the 17th cent., became obsolete in the 18th, but were reintroduced during the siege of Port Arthur, and were used everywhere in the trench warfare of the Great War. The sword is now simply a badge of rank, but the revolver is a necessary part of every officer's equipment.

Naval Armor, general term for the protective features of a modern warship, of which the most important part is the broadside armor, since upon this depends the safety of her engines, boilers, magazines, etc. Amongst the earliest Brit. iron warships was *Warrior* (1860); but for some time afterwards it was the practice to armor wooden ships with iron plates, $4\frac{1}{2}$ in. in thickness. This iron sheathing was subsequently increased to 6 in., 9 in., 12 in., and even 24 in. The use of steel plates was introduced by Schneider (1876), and this led

to the adoption of 'compound armor' (i.e.) steel surface on wrought-iron foundation plate, the combination being designed to render a projectile ineffective and yet preserve the plating intact. Compound armor was largely used from 1880-90, when further improvements were introduced (Harvey and Treslitter processes); and the use of nickel in steel plates was introduced by Schneider (1889). Krupp's armor for warships was first employed in 1897. The steel used in this process has a high tensile strength, and contains nickel, chromium, and manganese. Up to close of the Great War battleships and battle-cruisers of all nations were chiefly protected along their sides, in the region of their gun positions and the station from which the ship was conned and commanded in battle—this followed a tradition fully established before enormous extension of gun range and long-distance fighting now in vogue. Nowadays side armor is of exceedingly limited value in long-range action, and experience of the World War has demonstrated that the principles hitherto followed in armoring ships are not suited to modern conditions. This does not mean that protective plating in all circumstances will in future be discarded.

ARMORIAL BEARINGS, originally, devices placed on armor, especially shield, or coat worn over armor (from which arose term 'coat of arms'); later shield which shows devices, and crest, coronet, motto, etc. Hereditary *insignia gentilitia* existed X. cent., but were not in common use till XIII. cent.; by royal proclamation, 1419, nobody whose ancestors did not bear arms at Agincourt may assume them without royal license; all male descendants may bear them, female only in lozenge or under curtain.

ARMOUR, (JONATHAN) OGDEN (1863), an American capitalist and meat packer, b. in Milwaukee, Wis. He studied at Yale, but before graduating was persuaded by his father, Philip Danforth Armour, to join the latter in his business in Chicago, which he did, in 1883. When the firm of Armour & Co. was incorporated, in 1900, he became a vice-president, succeeding his father as president when the latter died, in the year following. Mr. Armour has since become a power, not only in his own industry, but in other allied lines of business as well. He is a director in many corporations beside his own, including the National City Bank, of New York, The Armour Grain Co. and The Armour Car Lines. In 1906 he wrote *The Packers and the People*, to counteract the prejudices aroused among the public against his industry by Upton

Sinclair's book, *The Jungle*.

ARMOUR INSTITUTE OF TECHNOLOGY (Chicago, Ill.), founded in 1892 by Philip Danforth Armour. It began with courses in mechanical and electrical engineering, then, in 1895, combined with the Art Institute of Chicago in establishing the Chicago School of Architecture. In 1899 civil engineering was added, in 1901 chemical engineering, in 1903 fire protection engineering, and in 1911 a course in the industrial arts was instituted.

ARMS CONFERENCE. See CONFERENCE, LIMITATION OF ARMAMENTS.

ARMSTRONG, DONALD BUDD (1886), an American hygienist, b. Bangor, Pa. Graduating from the College of Physicians and Surgeons, of Columbia University, in 1912, he became superintendent of the Bureau of Public Health and Hygiene, of New York City, then, two years later, executive official of the Framingham, Mass. Community Health and Tuberculosis Demonstration, conducted under the auspices of the National Tuberculosis Association, and financed by the Metropolitan Life Insurance Co. to the extent of \$100,000. Among his works are *Flies and Diarrheal Diseases* (1914); *Public Health in European Cities* (1915), and a number of important monographs on the results of the Framingham experiment.

ARMSTRONG, HELEN MAITLAND (1869), an American artist, b. in Florence, Italy. She received her first instructions in art in the Art Students' League, of New York City, but later studied under Rhoda, Niccoles, Irving R. Wiles and William M. Chase. Among her best and most typical works are the windows of All Saints Church, in Baltimore, Md., the windows in the armory of Mrs. O. H. P. Belmont's New York residence and the windows of the Church of the Ascension, in New York City.

ARMSTRONG, SAMUEL CHAPMAN (1839-1893), an American educator, b. on the Island of Maui, Hawaii. He was the son of one of the early missionaries to Hawaii, was educated partly in Oahu College, in Honolulu, then graduated from Williams College, in 1862. Immediately he entered the Union Army and fought throughout the Civil War, being discharged with the rank of brigadier-general. For two years after he had charge of a department of the Federal Freedman's Bureau, in which capacity he was responsible for the welfare of the Negroes in ten Virginia counties. Becoming thus interested in the race, he sought and found

the financial aid with which he established the Hampton Normal and Agricultural Institute, in 1868, in Hampton, Va. At first this institution was devoted entirely to the industrial education of Negroes, but in 1878, through the suggestion of the Federal Government, American Indians were admitted. At his death there were over 100 professors and teachers on the staff and 600 Negro and 200 Indian students.

ARMY. The term army in its widest sense signifies the force available to conduct operations against an enemy on land, and therefore includes men, horses, weapons, and other material of war. In a more restricted sense an army is any military force acting independently. The word is also used for legal and administrative purposes in various senses.

On looking backwards we find that an army has always been a reflection of the state of society or the stage of civilization which called it into being. An army has no inherent vitality, no germ of development. It flowers only to decay. In the earliest ages tribes of shepherds took up arms and laid them aside again, becoming a nation at peace or a nation at war under the leadership of their chiefs. In countries where the population was agricultural, some division of labor became necessary, since each tribe on taking the field was compelled to leave behind some men to sow and reap. Later still, when artificers had settled in towns, the trade of a soldier became specialized, and yet the army remained practically a militia, inasmuch as the character of the civilian predominated over that of the soldier, and troops could not be carried into distant countries for long periods without danger of mutiny.

The first armies of which we have any definite knowledge are those which fought at Marathon (490 B.C.), where Greek and Persian met. The Persian army of bowmen had reached some degree of perfection under Cyrus and his successor, Darius, but the Athenian spearmen under Miltiades won the victory; yet the Persians had overcome bowmen like the Medes, the Lydian lancers, and armored hosts like the Babylonians, Egyptians, and Greeks, and we must therefore attribute the Athenian victory at Marathon to superior leadership. The seeming phenomenon that an army will grow and diminish, prove irresistible and decline again, within a century, is accounted for by considering an army as the creation of a general with a genius for war, or as the instrument of a feeble ruler. Three Roman legions were exterminated by a German militia raised by Arminius; the armies of Sparta and other Gr.

republics could not withstand a force trained by Philip of Macedon and his son, Alexander the Great. The armies of Persia, of Carthage, of Macedon, and of Greece dwindled one by one as their leaders perished; the Roman army expired in its effort to check the Huns under Attila, who in the year 451 threatened to sweep away all trace of civilization and Christianity in Western Europe. Since the time of Abdul-Rahman, whom Charles Martel defeated at Tours in 732, we have seen no Oriental army capable of invading France.

In England, King Alfred (A.D. 871) raised a national army of militia to expel the Danes, but it proved unequal two centuries later under Harold to withstand the army of knights brought over by William of Normandy. Then came the feudal period, when powerful nobles exacted military service from their dependents, and hired these forces out to support any cause they adopted—at one time aiding their king, at another time opposing the king's forces, or even, as in the Wars of the Roses (1455), destroying one another. But not until the 16th cent. do we learn of an army fit to be compared with those of Greece and Rome. It was Philip II. of Spain who then incontestably bore the palm in respect of army and navy; but in the next cent. Gustavus Adolphus assumed the position which the death of Philip had left vacant, and became the military head of Europe, perfecting his army during the Thirty Years' War. The Civil War in this country produced the formidable militia of the Commonwealth, which subsequently was replaced by the royal standing army. Meanwhile Gustavus Adolphus had yielded place in the military world to Louis XIV, whose army procured him all that Napoleon coveted at a later period, but the rise of the Duke of Marlborough proved fatal to the Fr. army at the beginning of the 18th cent.

Modern Armies.—In the middle of the 18th cent. we find the modern army in embryo. Frederick the Great possessed about 50,000 Prussian infantry, cavalry, and artillery, an army which in the course of twenty years he developed to the highest pitch of excellence. He overcame the armies of France, Austria, and Russia in turn, and established a system of drill, discipline, and manoeuvre which ensured success in battle. But 'the soul of an army is the mind of a great commander,' and on Frederick's demise the Prussian army declined. Meanwhile with the Fr. Revolution many of the characteristics of primitive warfare were reproduced in the Fr. levies which fought at Valmy and Jemappes. The male population of France found occupation

in the army when civil disturbance had virtually put an end to the pursuits of peace. Untrained and undisciplined, but filled with an energy and spirit of adventure hard to realize to-day, they overthrew the royal standing armies of Europe and carried the tricolor beyond the Alps. This weapon the republican government placed in the hands of the world's greatest soldier. Napoleon, at Austerlitz and Jena, showed what was possible to an absolute ruler at the head of a large well-trained and well-equipped army; but his foes were not long in learning the lesson he had to teach them, and then the tide turned. After Waterloo the Fr. army, as Europe had known it for twenty years, ceased to exist.

Compulsory Service.—Scharnhorst and other army leaders in Prussia now showed the advantages to be gained by a nation which, in regard to its army, was independent of local and ephemeral opinion, by enacting laws under which the entire male population were subject to military service; and what is more, to rigid and continuous military training. Prussian commanders in the field were never again to fail for want of numbers of trained soldiers. Moreover, the universal obligation to serve put a premium on military rank, so that the profession of arms became one to which the élite of society naturally turned. A war school was established at Berlin, out of which grew a great general staff, which in turn produced men of the type of Moltke and von Roon. Royal personages were bred to arms, and when in 1866 Prussia invaded Austria she had at head of her armies the king and his two sons. Their easy victory over the Austrians at Sadowa, and four years later over the French at Gravelotte and Sedan convinced the world that her methods were perfect; and from that time up to the Great War it was the aim of every first-class continental power to model its national forces upon the Prussian army. The rigid Prussian method, while it had its virtues, showed clearly during the Great War that it also had the seeds of weakness within itself. It especially failed to produce soldiers of initiative, capable of 'carrying on' without the direction and stimulus of officers.

Up to the year 1916 Great Britain was the most notable exception to the rule of universal service.

When the World War ended, there was an almost universal sentiment among the peoples who had been at war for a reduction in the military strength and a strong effort was made to incorporate in the League of Nations provisions providing for practical disarmament. It was, however, found impossible to bring about this result, and the

victorious nations were left practically free to raise and equip armies. Great Britain rapidly demobilized her army until it had reached practically pre-war strength, and was composed of about 250,000 men. The French army, on account of threatened conditions on the continent, continued to maintain a large military force, numbering nearly 500,000 men and officers. The largest army maintained was that of Russia, where it was claimed that the Red Army numbered over 1,000,000 men. Little actual information was available as to the truth of these figures. The German army was reduced by the terms of the Treaty of Versailles to a maximum of 100,000 men. As a result of disturbances in Germany, however, an increase to 200,000, composed of various kinds of organizations, was permitted. Poland maintained an army of considerable strength, and as a result of the war with Russia and the constant threat of Russian aggression, the army numbered, in 1923, about 250,000 men of all classes. Nearly all the countries of Europe maintained armies of considerable strength, and the dream of military disarmament appeared to be far in the future. For the organization of the strength of the army of the United States, see ARMY, UNITED STATES.

ARMY SCHOOLS. See MILITARY

ARMY, UNITED STATES. In 1916 the army of the United States consisted of 2,160 officers and 45,873 men of the Regular Army; and 5,446 officers and 105,080 men of the National Guard, making a total of nearly 160,000 men. The war in Europe and the very probable participation of the United States in it aroused the attention of Congress and the people to the necessity of providing a more adequate and mobile army, and on June 3, of that year, the President approved the National Defense Act which had been passed by Congress. By the terms of this act the army consisted of the Regular Army, the Volunteer Army, the Officers Reserve Corps, the Enlisted Reserve Corps, the National Guard while in the service of the United States, and such other land forces as were thereafter authorized by law. The infantry regiments of the Regular Army were increased by $34\frac{1}{8}$, the cavalry by 10, the field artillery by 15, and the coast artillery corps by 93 companies. The Engineers, for the first time in the military history of the United States became a proper organization of the Regular Army. It consisted of 7 regiments and 2 mounted battalions. The number of general officers was also increased, and the General Staff Corps was increased from 38 to 57 officers.

It was provided that this increase of the Regular Army was not to take place at once but was to be made in five annual increments, beginning July 1, 1916 and closing July 1, 1920. The President was authorized to make an increase more rapidly, should emergency call for it. The result of the increase of the Regular Army, when completed, would be to add 6,420 officers and about 170,000 enlisted men. The peace strength of the Regular Army was fixed at not to exceed 175,000 troops of the line.

No provision was made with respect to the Volunteer Army as that element of the National Defense was to be called into existence only in time of war. A reserve was also created for the purpose of securing men for military service with the Engineer, Signal and Quartermaster Corps. The militia was defined as consisting of the National Guard, the Naval Militia, and the Unorganized Militia. Enlistment with the National Guard was to be for six years, the last three in the National Guard Reserve. The most important feature of legislation dealing with this organization was the requirement of a Federal enlistment contract by which officers and men were required to take a Federal oath.

The declaration of war with Germany, on April 6, 1917, brought into effect the provisions of this law by which the President was authorized to increase the army to any extent necessary.

About 4,000,000 men served in the Army of the United States during the war (April 6, 1917 to November 11, 1918). The total number of men serving in the armed forces of the country, including the Army, the Navy, the Marine Corps, and the other services, amounted to 4,800,000. It was almost true that among each 100 American citizens 5 took up arms in defense of the country.

The most difficult feature of the American undertaking was to be found in the concentration of the major part of the effort into the few months of the spring and summer of 1918. When the country entered the war it was not anticipated in America, or suggested by France and England, that the forces to be shipped overseas should even approximate in numbers those that were actually sent.

It was not until the German drive was under way in March 1918, that the allies called upon America for the supreme effort that carried a million and a half soldiers to France in six months.

When war was declared there were only 200,000 in the Army. Two-thirds of these were Regulars and one-third National Guards—men who had been

called to Federal service for duty along the Mexican border. When the war ended this force had been increased to 20 times its size and 4,000,000 men had served.

After the signing of the armistice, demobilization of troops was begun immediately. More than 600,000 were discharged during December. Forces in this country were at once cut to the lowest point consistent with carrying on the storage of equipment and settlement of contracts, and the discharge of men returning from overseas. In spite of the time necessary for return of overseas forces, demobilization was carried forward more rapidly in proportion to the number under arms than in any previous American war.

More than half a million came in through the Regular Army. Almost 400,000 more, or nearly 10 per cent., entered through the National Guard. More than three-quarters of all came in through the selective service or National Army enlistments. Of every 100 men 10 were National Guardsmen, 13 were Regulars, and 77 belonged to the National Army, or would have if the services had not been consolidated and the distinctions wiped out on August 7, 1918.

The willingness with which the American people accepted the universal draft was the most remarkable feature in the history of our preparation for war.

It is noteworthy evidence of the enthusiastic support given by the country to the war program that, despite previous hostility to the principle of universal liability for military service, a few months after the selective service law was passed, the standing of the drafted soldier was fully as honorable in the estimation of his companions and of the country in general as was that of the man who enlisted voluntarily. Moreover, the record of desertions from the Army shows that the total was smaller than in previous wars and a smaller percentage occurred among drafted men than among those who volunteered. The selective service law was passed on May 19, 1917, and as subsequently amended it mobilized all the man power of the Nation from the ages of 18 to 45, inclusive. Under this act, 24,234,021 men were registered and slightly more than 2,800,000 were inducted into the military service. All this was accomplished in a manner that was fair to the men, supplied the Army with soldiers as rapidly as they could be equipped and trained, and resulted in a minimum of disturbance to the industrial and economic life of the Nation.

The first registration, June 5, 1917, covered the ages from 21 to 31. The second registration, one year later

(June 5, 1918 and August 24, 1918) included those who had become 21 years old since the first registration. The third registration (September 12, 1918), extended the age limits downward to 18 and upward to 45.

In the fall of 1917 the first half million came in rapidly. During the winter the accessions were relatively few, and those that did come in were largely used as replacements and for special services. In the Spring of 1917 came the German drive and with it urgent calls from France for unlimited numbers of men. Then over a period of several months the numbers of new men brought into the service mounted into the hundreds of thousands, and reached their highest point in July, when 400,000 were inducted. During the succeeding months the numbers fell off considerably on account of the epidemic of influenza, and with November the inductions ceased entirely due to the unexpected ending of the war.

About 200,000 commissioned officers were required for the Army. Of this number, less than 9,000 were in the Federal service at the beginning of the war. Of these, 5,791 were Regulars and 3,199 were officers of the National Guard in the Federal service.

The figures show that of every six officers one had had previous military training in the Regular Army, the National Guard, or the ranks. Three received the training for their commissions in the officers' training camps. The other two went from civilian life into the Army with little or no military training. In this last group the majority were physicians, a few of them were ministers, and most of the rest were men of special business or technical equipment, who were taken into the supply services or staff corps.

At the end of the World War there was a very insistent demand by the American people for a reduction in military strength, and in 1921 measures were passed in Congress providing for such a reduction and for a general reorganization of the army establishment. On June 4, a measure was passed amending the so-called National Defense Act of June 3, 1916. The Regular Army by the terms of this act was defined anew so as to include new branches, namely the Air Service, the Finance Department, the Chemical Warfare Service (Gas Service), and it was declared that the organized peace establishment including the Regular Army, the National Guard, and the Organized Reserve shall include all of those divisions and other military organizations necessary to form the basis for a complete and immediate mobilization for the National defense

in the event of a National emergency declared by Congress.' The principle of corps regions was established. There were nine of these, embracing all parts of the country. The act provided for 21 major generals and 46 brigadier generals. An important portion of the measure was devoted to the organization of the General Staff Corps, which consists of the Chief of Staff of the War Department, the General Staff, and of the General Staff of Troops. The office of Assistant Secretary of War was created. This official was authorized with the procuring of all military supplies and other business of the War Department obtaining thereto. Important revisions were made in the matter of promotion.

The provisions relating to the National Guard and Militia were on the whole, unchanged. The qualifications for National Guard officers were, however, fixed, and the Militia Division of the War Department became the Militia Bureau, with a chief to be drawn from the National Guard, to hold office for four years and to have the rank, pay, and allowances of a major general. The Organized Reserves were made to provide and organize in cadres which may be extended into an adequate war element in the Army to meet any emergency requiring troops in excess of the Regular Army and the National Guard. In the time of peace it is to be maintained at such strength as may be necessary to form a skeletonized organization, capable in an emergency, of broad expansion. The act provided for a Regular Army of approximately 280,000 men and 17,700 officers. It does not provide for universal military training or for the future application of the draft system.

Although the army officers and others made a strong effort to keep the army at this authorized strength, opposition in Congress and outside was so strong that Congress refused to appropriate a sufficient amount of money, and also passed measures providing for the gradual reduction of the enlisted men to 150,000. This reduction continued in 1921-2, until in 1923 it had practically reached that figure. Citizens' military training camps, provided for by the amended act, were conducted in 1921-2. At these camps over 10,000 citizens completed their course of training. As a consequence of the reduction of the army, several regiments were reduced to a state of inactivity. They were practically only paper organizations. The army consisted, on January 1, 1922 of 138,000 enlisted men in the Regular Army, 128,500 in the National Army, and 64,300 in the Organized Reserves.

In the Regular Army there were 15,000 officers; in the National Army, 6,700 officers, and in the Organized Reserves, 261 officers. For an account of the performances of the Regular Army in Europe during the World War, see **WORLD WAR**, and **UNITED STATES**. Following the armistice, a garrison of about 3,000 men were stationed, in accordance with the terms of the armistice, in Coblenz, Germany. This was entitled the Army of Occupation, and the force was maintained, although gradually diminished, until January, 1923, when it had reached to the strength of about 1,000 men. This remaining force was recalled by President Harding, leaving the United States with only formal representation consisting of a small number of officers in Europe. As a result of the decrease in the strength of the army, over 2,500 officers either resigned or were discharged from service in 1922.

ARMY WAR COLLEGE, a military educational establishment forming a part of the military system of the United States, authorized by Congress in 1900. The purpose of the College is the study of the military organization of the United States, with an eye to a complete understanding of its practical efficiency operations. It includes also the study of the military systems of foreign countries. The College constitutes an Advisory Board, to which the Secretary of War can turn at any time for details and recommendations relating to military service. The War College really constitutes a post-graduate course for army officers.

ARNAUD, HENRI (1641-1721), Vauds general and pastor; untiring in efforts to secure restoration of his countrymen to their native valleys.

ARNAULD, ANTOINE (1612-94, 'le grand Arnauld,' whose long life was indissolubly connected with the convent of Port Royal, identified himself with religious doctrines of Jansen; part author with Nicole of *Port Royal Logic*.

ARNDT, ERNST MORITZ (1769-1860), Ger. poet and patriot, was instrumental in abolition of serfdom (1806) by his work *Geschichte der Leibeigenschaft in Pommern und Rugen* (1803). † Was poet-laureate of War of Liberation; his patriotic songs include *Vas ist des deutschen Vaterland?*

ARNE, THOMAS AUGUSTINE (1710-78), Eng. composer, was leader in the revival of the glee. Wrote music for the *Masque of Alfred*, which contains 'Rule Britannia,' and *As you Like It* ('Where the Bee Sucks').

ARNHEM, ARNHEIM (51° 59' N., 5° 55' E.), town, Holland; formerly fortified; manufactures woolens, cottons, tobacco, soap, paper; in Grootte Kerk is monument to Charles, Duke of Gelderland; fine public buildings; surroundings beautiful; twice stormed by French, who were driven from it by Prussians, 1813. Pop. 64,200.

ARNICA, genus of plants belonging to nat. ord. Compositæ; most important species is *Arnica montana*, perennial herb of Europe and N. America. Tincture, used for sprains and bruises, is prepared from it.

ARNIM, LUDWIG VON (1781-1831), Ger. novelist and poet; pub. collection of legends and ballads under title of *Des Knaben Wunderhorn* (1806-8); numerous hist. and other novels.

ARNO (43° 50' N., 11° 40' E.); river Italy; on it stand Florence and Pisa; enters Gulf of Genoa.

ARNOLD, BENEDICT (1741-1801), Amer. soldier, b. Norwich, Connecticut; originally a trader, he co-operated in Montgomery's unsuccessful attack on Quebec, 1775; was commissioned brigadier-general, 1776; major-general, 1777. He distinguished himself in both battles of *Saratoga*, and received command of Philadelphia, 1778; reprimanded for alleged misconduct, 1780; plotted to betray West Point. On plot being discovered, A. escaped to Brit. lines, and became a brigadier-general in Brit. army.

ARNOLD, BION JOSEPH (1861) an American electrical engineer, b. near Grand Rapids, Mich. He graduated from the University of Michigan, in 1884, then took a year's post-graduate course at Cornell University. Several years later he established himself as a consulting electrical engineer. He is chiefly known on account of the important work he did in planning the New York subway system, and his supervision of the electrification of the New York Central R.R. lines, but he is also a pioneer in alternating current and single phase electric traction systems. During the war against Germany he served in the Army, with the rank of lieutenant-colonel, in the aircraft department.

ARNOLD, SIR EDWIN (1832-1904), Eng. poet and journalist; won Newdigate Prize (1852) on subject of *Belshazzar's Feast*; was schoolmaster at Birmingham, principal of Sanskrit College, Poona, and, taking to journalism, eventually became editor of *Daily Telegraph*. His best known poem, *The Light of Asia* (1879), dealing with the life and teaching of Buddha, won wide popularity.

ARNOLD OF BRESCIA (1100-55), Ital. monk, pupil of Abelard, was accused of heresy by St. Bernard; denounced the worldliness and wealth of higher clergy; established a republic in Rome on early Christian lines; finally condemned and executed.

ARNOLD OF WINCKELRIED, Swiss patriot to whom victory of Sempach over Austrians, 1386, was due.

ARNOLD, MATTHEW (1822-88), Eng. poet and critic; s. of Dr. Arnold of Rugby; ed. Rugby, Winchester, and Oxford; won Newdigate Prize (*Cromwell*), 1843; Fellow of Oriel, 1845; prof. of Poetry, Oxford, 1857-67; inspector of schools, 1851-86. His poetical works are: *The Strayed Reveller* (1849), and *Empedocles on Etna* (1852), both pub. under the initial 'A.'; and under his full name, *Poems* (1853); *Poems*, 2nd Series (1855); *Merope* (1858); *New Poems* (1867). Among his prose works are: *On Translating Homer* (1861-62); *Essays in Criticism* (2nd Series, 1865); *Study of Celtic Literature* (1867); *Culture and Anarchy* (1869); *Friendship's Garland* (1871); *Literature and Dogma* (1873); *God and the Bible* (1875); *Mixed Essays* (1879); *Discourses in America* (1885).

ARNOLD, RALPH (1875), an American geologist and engineer, b. in Marshalltown, Ia. He graduated from the Throop Polytechnical Institute, of Pasadena, and later studied and taught at the Leland Stanford, Jr. University, but subsequently established himself as a consulting engineer, specializing in petroleum works. As an expert in this line he became connected with the United States Bureau of Mines, in 1911. In 1918-19 he was valuation expert for the Federal Excess Profits Tax Board.

ARNOLD, THOMAS, D.D. (1795-1842), Eng. schoolmaster; head of Rugby School, 1828; prof. of Modern History at Oxford, 1841. His remarkable personality exercised a lasting influence over his pupils.

ARNULF (d. 899); Rom. emperor; famous soldier and churchman.

AROMATICS, a name given to certain substances possessing a fragrant, spicy smell or aroma, and a warm pungent taste, chiefly obtained from essential oils of various plants and much used in medicine, (e.g.) peppermint, cardamoms, etc. Musk and civet are animal aromatics, obtained from the glands of the musk deer and civet cat respectively.

ARONOVICI, CAROL (1881), a Rumanian-American writer on sociological topics, b. in Rumania. After studying at

home and in Paris, he came to this country in 1900, graduating from Cornell University in 1905. After settlement work in Providence, R.I., he was appointed director of housing by the California State Commission on Immigration and Housing, serving as such during 1919-20. Among his books are *The Social Survey* (1916); *Americanization* (1919), and *Housing and the Housing Problem* (1920).

ARPAD (d. 907), founder of Hungarian dynasty of A., whose members ruled till 1301, assuming title king, 1001.

ARPEGGIO (music), a chord of which the constituent notes are sounded consecutively upwards, instead of simultaneously.

ARPINO, tn., Italy (41° 39' N., 13° 36' E.); birthplace of Marius, Cicero, and Giuseppe Ceasari; represents anc. *Arpinum*. Pop. 11,000.

ARQUA, vil., Padua, Italy (45° 16' N., 11° 43' E.); Petrarch lived here (1370-4); his house exists; tomb in front of church.

ARQUEBUS, a firearm of the XV. and XVI. cents., being an improvement upon the *gonne*, or *hand-cannon*, of the Middle Ages. It was in use as far back as the reign of Richard III., but, towards the end of the XVI. cent., was displaced by the musket.

ARRAIGNMENT, a 'true bill' having been found against a prisoner, he is brought into open court and 'arraigned,' (i.e.) the indictment is read over to him, and he is asked whether he pleads 'guilty' or 'not guilty.'

ARRACK, name applied in the E. to any alcoholic spirit obtained by distillation of fermented saccharine liquids.

ARRAH, tn., Bengal, India (25° 34' N., 84° 40' E.); small party of British and Sikhs unsuccessfully besieged by sepoys (1857). Pop. 38,600.

ARRAN (55° 35' N., 5° 15' W.), island, Firth of Clyde, Scotland; area, 165 sq. miles; chief villages, Brodick, Lamlash, Corrie, summer resorts; excellent fishing and game; surface mountainous, highest peak, Goatfell; rainfall heavy; cairns and stone circles occur; ruined castles are Loch Ranza and Kildonan; Brodick Castle belongs to dukes of Hamilton; produces oats, potatoes. Pop. 4628.

ARRAS, tn., former cap. of Artois (50° 17' N., 2° 45' E.), now of dep. Pas de Calais, France, on the Scarpe, 35 m. N.E. of Amiens and 120 m. N. of Paris; in 14th and 15th cents. famous for tapestries; one of principal grain

markets of France; had many experiences of destruction and siege from the time of the Vandals (A.D. 407) to the Great War (1914-18). Pop. 26,700. An important ry. jn. and road centre it holds. a commanding position over the Scarpe and on the forward foothills of the high land stretching back to the Channel ports, hence its stubborn defence by the Allies. The first train loads of Brit. soldiers arrived at Arras on Aug. 15, 1914. On Aug. 31 the Germans were at the gates in pursuit of the Allies, and on Sept. 8 quitted the town, moving towards Amiens and Paris; on Sept. 16, after their defeat at the Marne, the invaders returned and remained till the 18th, when they were ejected by the French. From Oct. 1 to 8 a great battle raged E. of the town, which suffered severely by bombardment, the hotel de ville and the cathedral being repeatedly hit. In the succeeding months the shelling was resumed from time to time, and the town was even more thoroughly ruined than Reims. In the spring of 1915 the French successes to the N. gave the town greater security, and from early in 1916 onwards its defence was entrusted to the Brit. army, which in the spring of 1917 pushed the Germans farther back to the E., and defeated the enemy's last attempt to capture the town on March 28, 1918. Had Arras fallen at that time, the Ger. thrust at Amiens would probably have succeeded. On Aug. 25 the British began to advance from Arras astride the road to Cambrai.

ARREST, an arrest is not usually made without the authority of a 'warrant,' which is a written order instructing an officer to bring the suspected person before a Court. A policeman can arrest without a warrant any one whom he suspects of having committed a felony, any one committing, or having committed, or being about to commit a breach of the peace, or any one doing wilful damage to property. A private person may arrest without warrant any one suspected of having committed a felony, provided a felony has been committed, any one whose freedom will lead to a breach of the peace, any one committing or about to commit treason, any one committing offences, and any one for whom he has become bail when he wishes to be relieved of liability.

ARRHENIUS, SVANTE AUGUST (1859), a Swedish chemist and physicist. After graduating from Upsala University, he began teaching, becoming professor at the University of Stockholm, in 1891. He was awarded the Nobel prize for chemistry, in 1903. In 1904 he visited this country and lec-

tured before the students of the University of California. Prof. Arrhenius is known as a strong defender of the theory assuming that life is an interstellar element, and may be transmitted from one planet to another by means of meteors. His best known work, translated into English, is *Worlds in the Making*, 1903.

ARRIAGA, MANOEL DE (1842), Portuguese statesman, b. in Horta, the Azores; d. in Lisbon, Portugal, Mar. 5, 1917. He was for many years one of the leading lawyers of the Portuguese capital, Lisbon, and during this period was known as an ardent Republican, being several times elected to the National Assembly as a representative of that political party. Here he became also prominent as an orator. He was one of the leaders of the revolution in 1911, which dethroned the King and established a Republic. On August 24, 1911, he was elected the first President of the Republic of Portugal.

ARRONDISSEMENT (Fr., from *arrondir*, to make round), division of Fr. department for purposes of administration; name given in 1800 to newly formed district of 1790.

ARROW, a slender, generally pointed, missile weapon made to be shot from a bow.

ARROWHEAD (*Sagittaria*), a genus of a dozen species of aquatic plants, the leaves of which above the water are arrow-shaped.

ARROWROOT, edible starch obtained from root-tubers of a plant (*Maranta Arundinacea*) growing in W. Indies and the tropics generally; a valuable food for invalids.

ARSENAL, word of Arabic origin which occurs in many languages; used of a large store containing war equipment and ammunition.

ARSENIC (As = 74.96), metalloïd in nitrogen group; name, however, popularly applied to 'white arsenic,' arsenious oxide. Element occurs native, combined with metals, as sulphides, also in small quantities in pyrites, coal, etc.; and is obtained as a sublimate by heating arsenical pyrites. A. is a steel grey, metallic-looking, good conductor of heat and electricity; has S.G. 5.73; sublimes at 450°, vapor smells of garlic, molecule As, condenses to (i.) yellow and (ii.) mirror allotropes; burns to oxide As₂O₃; used for hardening lead shot.

ARSENIUS (d. 450), a Roman anchorite who was sometimes tutor to the children of Theodosius the Great; spent his last 40 years as a recluse in

Egypt, where he won general admiration for sanctity of life.

ARSINOE, name of several Egyptian queens. Best known A. (d. 271 B.C.); dau. of Ptolemy I., sister and w. of Ptolemy II. (who killed his first wife, another A., at his marriage); accorded divine honors in her lifetime; she and her husband both called Philadelphus through their consanguinity. Another A. was sister of Cleopatra.

ART. Many attempts to define 'art' have been made, but no very satisfactory results have been achieved. Dr. Johnson's definition runs: 'The power of doing something which is not taught by Nature or by instinct.' Pope says: 'True art is Nature to advantage dressed;' while Sir Thomas Browne tells us: 'Nature is the art of God.' If it be conceded, however, that art includes everything which we distinguish from Nature, it will readily be seen that Johnson's definition is very wide of the mark. It is the business of art to develop Nature, and no art can exist either in form, color, sound, speech, or movement, which is not in the first place inspired by Nature. The earliest attempts at pictorial art which have been discovered amongst the remains of primitive peoples invariably take the form of rude drawings of birds and beasts. It may therefore be supposed that early man had been impressed by the physical beauty of these animate objects, and had, from an instinctive love of the beautiful, attempted to perpetuate them. It has been said that 'A man's the noblest work of God,' and thus it came about that those early masters of Sculpture, Phidias and Praxiteles, casting about for objects upon which to exercise their genius, found their ideal in reproducing the perfect beauty of the human form. So with Painting, with Poetry, and with Music, Nature is ever the first means of inspiration. The glory of the sunrise, the terror of the storm, the song of the lark, the beauty of the summer landscape, each in its own way arouses to noblest effort the painter, the musician, and the poet; and so Nature, working through man, produces what we term Art.

Art Galleries.—National, munic., or private buildings for the exhibition of paintings, sculptures, and other works of art, for the purpose of fostering and educating a taste for aesthetics. Amongst buildings of the kind the National Gallery, London (founded 1824), holds a deservedly high place. It is maintained by a government grant, and has been enriched by numerous private bequests. With the exception of the French, the gallery is well represented

by practically every school, some outstanding pictures being Raphael's *Madonna* (bought for £70,000), Van Dyck's *Charles I.* (bought for £17,500), and Velasquez's *Venus*. The National Portrait Gallery (founded 1856), the Tate Gallery, and the Wallace Collection should also be mentioned, while other galleries in London and provincial towns are too numerous even to be named. Amongst great continental galleries the place of honor should undoubtedly be given to the Louvre, in Paris, while other institutions of world-wide fame are the Imperial Gallery at Vienna, those at Berlin, Dresden, and Munich, and the Hermitage Gallery at Petrograd. Among the famous galleries in U.S. are the Museum of Art, New York, and Museum of Fine Arts, Boston, which represent all schools; the Academy, Philadelphia, the Chicago Collection and Public Library, New York, rich in Flemish and Fr. pictures; and there are the splendid collections of the late J. Pierpont Morgan, and Mrs. Gardner. In Italy the Pitti and Uffizi Galleries, at Florence, are of the first importance the former being especially rich in examples of Raphael, Giorgione, Perugino, and Andrea del Sarto, the latter in works by Michelangelo, Botticelli and Leonardo da Vinci. Other celebrated galleries are at Rome (Corrini and Borghese Galleries), Venice, Genoa, Milan, Pisa, Verona, Perugia, and Padua; at The Hague, Harlem, Rotterdam, and Leyden; at Antwerp, Bruges, and Cologne; and at Seville and other cities of Spain.

ART, METROPOLITAN MUSEUM OF, an art museum in New York City which is the largest and most inclusive in the United States. It was established in 1870 and \$500,000 was appropriated by the State Legislature for a building in Central Park. The first building was completed in 1879. To this have been added, from time to time, other wings until the total cost of the building has reached about 20 million dollars. The museum is governed by a Board of Trustees and is administered by a Director, Secretary, Treasurer, and other officials. About \$200,000 is appropriated annually by the city, while the remainder of the expenses are met through contributions. The museum contains many collections of the first rank. The department of painting is especially notable, and in recent years the department of Egyptology has received contributions which makes it one of the largest and most inclusive in the world. The William H. Riggs collection of Arms and Armor in scope and quality ranks with European

National Collections. The museum has received many large legacies and bequests and also many important collections of paintings and other objects of art. An additional wing to house the Pierpont Morgan collection was completed in 1918, and an additional wing is to be erected in which is to be placed the Altman collection of paintings left to the museum by Benjamin Altman.

ARTAGNAN, CHARLES DE BAATZ D (c. 1612-73), original of character d'A. in *Three Musketeers* and other tales of Dumas.

ARTAXERXES I. (465-425 B.C.); king of Persia, younger s. of Xerxes; he made peace with Athens in 448, but did not take sides in the Peloponnesian War; is famous in Jewish history.—Artaxerxes II., king of Persia (404-359), s. of Darius II.; many rebellions took place in his reign, and for long the empire was weak under him.—Artaxerxes III., king (359-338); name adopted by Ochus, s. of preceding; he ruled sternly, compelled Athens to make peace, and tried to conquer Egypt.—Artaxerxes IV., or Ardashir I. (q.v.).

ARTEMIS (classical myth.); dau. of Zeus and Leto, and twin-sister of Apollo. She is sometimes called Ortygia and Cynthia, from places associated with her birth. To the Romans she was known as Diana, the goddess of hunting. A. was worshipped by the Greeks under various names, to each of which belonged special characteristics. Thus she is known as the Arcadian, Ephesian, and Brauronian A.

ARTEMISIA.—(1) (fl. 480 B.C.). Queen of Halicarnassus; famed for Amazonian qualities. (2) (fl. 353-350 B.C.), Queen who built the Mausoleum in Halicarnassus, one of seven wonders of the world.

ARTEMUS WARD, pseudonym of Charles Farrar Browne (1834-67), Amer. humorist whose lectures in America and Europe and writings had great success.

ARTERIES, the vessels which carry the blood from the heart to the different parts of the body. The walls of a's consist of three coats; the external, or *tunica adventitia*, of fibrous tissue; the middle, or *tunica media*, of muscular and yellow elastic tissue, muscular fibres predominating in the larger and elastic fibres in the smaller a's; and the internal or *tunica intima*, of endothelial cells. The two chief a's of the body are the pulmonary a. and the aorta; the pulmonary a. conveys the impure, or venous blood, from the right side of the heart to be purified in the lungs, while the aorta conveys the purified blood

from the left side of the heart, to which the blood comes from the lungs, to the tissues of the body by means of its branches. Small a's join, or anastomose, with one another freely; so that, if a large a. is blocked, the circulation can be carried on by the anastomosing branches, except in the case of the 'end-arteries,' found, e.g., in the brain and the spleen, which do not anastomose with others; and consequently when one of the 'end-arteries' is blocked, the part which it supplies with blood dies.

ARTESIAN WELLS, name derived from a system of boring for water, which was first employed in Europe in the province of Artois, France. The fountains in Trafalgar Square are thus supplied; also several of the London breweries. The borings are made by means of spiral rods, and are carried through various strata until a water-carrying bed is reached. The water rises to the surface in virtue of hydrostatic pressure, its source being higher than the mouth of the boring.

ARTEVELDE, JACOB VAN (c. 1290-1345), Flemish leader and brewer; rose to prominence in his native city of Ghent in 1337; he ruled like a king, and Ghent prospered, but A. was killed in a popular rising, 1345.

ARTEVELDE, PHILIP VAN (d. 1383), Flemish military leader; killed at *Roosebeke*.

ARTHRITIS, inflammation of joints, usually associated with gout or rheumatism.

ARTHROPODA, phylum of bilaterally symmetrical, segmented animals, having variously modified jointed appendages and a cuticle of chitin. Numerous affinities exist between them and Annelids, notably in the division of the body into segments, the organization of blood-vascular and nervous system. A. are usually very active, and represent more than half the known species of animals. The chief classes are *Crustacea*; *Prototracheata*, including the primitive *Peripatus*; *Myriopoda*, the centipedes and millipedes; *Hexapoda*, insects; *Arachnoidea*, spiders, scorpions, and mites; *Palaeostraca*, the king-crab; and the extinct eurypterids and trilobites.

ARTHUR, KING (VI. cent.), Brit. king, the actual facts of whose life are almost lost in legend. He is said to have been the s. of Uther Pendragon by Igrerna, wife of Gorlois, king of Cornwall. He was probably half-Roman, and chosen by the Christian Britons as general (about 520 A.D.) against the Saxons, whom he defeated; afterwards

he fought the heathen Britons, and was betrayed and slain.

Arthurian Legend.—After his death A. became a hero of Celtic legend in Cornwall, Wales, and Cumberland. About 850 Nennius mentions him and his battles against the Saxons, and the treachery of his nephew Mordred. In Welsh poetry of the XI. and XII. cent., he is spoken of as half-man, half-wizard, and the names of his allies, Kay, Bedivere, and Geraint, are given. The Welsh legends were carried to Brittany and France, whence the Romans brought them to England. About 1120 Geoffrey of Monmouth introduced Arthur into his *History of the British Kings*, dwelling on his miraculous birth and death, his conquests and the chivalrous side of the legend. This book was put into verse by Wace, a Norman, and Layamon, an Englishman (about 1150), each adding legendary touches, such as that of Excalibur, Arthur's sword. In France the legend became mixed with other legends, such as those of the Holy Grail, Percival, Lancelot and Tristram, and the idea of the 'Round Table' arose. The chief Fr. poets of Arthurian legend are Chrétien de Troyes and Marie de France. In Germany the legend was further amplified by Wolfram von Eschenbach. In the prose romances of the XIII. and XIV. cent. (notably those of Walter Map) the story of Lancelot and Guinevere (A.'s wife) was evolved. Later on, most of the Arthurian cycle was collected by Sir Thomas Malory in his *Morte d'Arthur* (1470). In late Eng. literature the legend has been dealt with by Spenser in his *Faery Queen*, Tennyson in his *Idylls of the King*, and Swinburne in *Tristram of Lyonesse*.

ARTHUR I. (1187-1203), Duke of Brittany; supposed to have been murdered by John, king of England.

ARTHUR, CHESTER ALAN (1830-86), Pres. (Republican) of the U.S.A. on death of Pres. Garfield, 1881; his term of office was noted for tariff legislation, the prohibition of polygamy in the territories, and railway enterprise.

ARTHUR, JULIA (IDA LEWIS), (1869), an American actress. b. in Hamilton, Ont., Canada. She made her professional debut as the Prince of Wales in 'Richard III.', at the age of fourteen, but her first success was achieved some years later in 'The Black Masque,' played in the Union Square Theater, New York City. In 1895 she became a member of the Henry Irving company, in London, where she played leading roles, next to Ellen Terry. With Irving's company she came to this country the

following year, appearing as Josephine Bonaparte in 'More than Queen.' She was a favorite in Shakespearean plays, and for years presented scenes on the vaudeville stage. She appeared as Hamlet in 1923.

ARTICHOKE, two plants of order Compositæ; *Helianthus tuberosus* or Jerusalem artichoke, now cultivated as vegetable for its edible tubers, and *Cynara scolymus*, the globe artichoke, for succulent leaf scales and axis of flower heads.

ARTICLE (Fr., from Lat. *articulus*, dim. of *artus*, 'joint'), division, and, by transference, portion between divisions; hence applied to clauses of agreements (in same sense as *capitulum*), items in magazines, etc.; again by transference, any separate object. Various Christian codes are known as articles of faith. *Ten Articles*, 1536, promulgated by Henry VIII.

ARTICLES OF CONFEDERATION.

These articles, a compact for the perpetual Union of the Thirteen Colonies were first submitted by Benjamin Franklin, July 21, 1775, to the Continental Congress, and after undergoing repeated changes by amendments the draft of the articles were reported to Congress on July 12, 1776. These were debated from July 22 to July 31 and again from August 5 to August 20, 1776. The subject was not touched upon again until April 8, 1777 and debated several times between that date and November 15, 1777. On the latter day the Articles, with final amendments were adopted by Congress. By the Articles of Confederation each of the thirteen colonies were annually to send to Congress not more than seven and not less than two delegates. No thought was taken of population as a base of representation. The burden of supporting the delegates was put upon the colonies sending them and as this was felt to be considerable a preference to ten delegates as against seven was at once shown. During the war a sense of fear kept the delegates for each colony up to two at least but after the war attendance fell off fast. Only seven states represented by twenty delegates witnessed Washington's resignation, while twenty-three representatives of eleven States ratified the Treaty of Peace. On the 26th of June, 1778 an engrossed copy was prepared for ratification and on July 9, 1778 it was ratified by all the States except Maryland and Delaware in 1778; by Delaware in 1779 and by Maryland on March 1, 1779, from which date final ratification took place and was joyfully announced by Congress. Most

of the objection to ratification centered on proposed boundaries by some of the States and public lands held by the Crown. By 1786 it was the general conclusion that the government under the Articles of Confederation was inadequate for protection, prosperity or comfort, and that immediate and thorough reform was necessary. Another convention was recommended to be held at Philadelphia in May, 1787. Congress by resolution approved the report and the proposed Convention resulted in the forming of the Constitution of the United States.

ARTICLES, THE THIRTY-NINE, a statement of the doctrine of the Church of England embraced in 39 particular points on which is based the belief of the Church. These Thirty-nine Articles were first promulgated at a Convention which met in London in 1562-63 and superseded an older code of profession of faith issued during the reign of Edward VI. The Articles are as follows: Articles 1 to 5 deal with a profession of faith in the Trinity, the Incarnation of Jesus Christ, His descent into Hell, His resurrection, and the Divinity of the Holy Ghost; Articles 6, 7, 8 relate to the Canon of the Scriptures, including the Apostles, Nicene and Athanasian Creeds; the ninth and articles immediately following pertain to the doctrine of Original Sin, of Justification of Faith alone and of Predestination; the 19, 20, 21 Articles treat of the Church as an assembly of the faithful, that it depends entirely upon the Scriptures; by the 23rd Article the doctrine of Purgatory is rejected as well as Indulgences and Invocation of all Saints; the 24th Article commands all the liturgy to be in English; the 25th and 26th Articles pertain to the Sacraments; the 27th gives Baptism as a sign of Regeneration and Seal of Adoption; the 28th and 29th treat of the Lord's supper, the bread is the Communion of His Body, the wine of His blood; the 31st Article rejects the mass; the 32nd permits marriage of the Clergy; and the 33rd maintains the right of excommunication. The remaining articles touch upon the supremacy of the King and minor matters. These articles were ratified again in 1604 and in 1628. All candidates for orders must comply with these articles and subscribe to them. These articles are accepted by the Episcopal churches of Scotland, Ireland and America.

ARTIFICIAL LIMBS. The art of making artificial limbs to replace those lost by injury or by malformation at birth is believed to be a very old one. In the museum of the Royal College of Surgeons, London, is an artificial leg

made of wood, bronze and iron which was found in a tomb at Capua, Italy. It is estimated that this limb was made about the year 300 B.C., and there is little doubt that in still earlier times artificial limbs of simple construction were in use. For many centuries, and in all countries, much ingenuity and study have been spent in designing limbs which shall approximate as closely as possible to the efficiency and adaptability of those they are intended to imitate, and many of those manufactured at the present day are marvelously efficient substitutes. Artificial arms are made with hands which move at the wrist and fitted with movable fingers, and thumbs which move laterally. They are covered with gutta-percha and india-rubber, to imitate the softness of flesh, and with them the owner can write, hold papers, drive a locomotive and even use a pickaxe. Artificial legs are comparatively simple to construct, and with them the owner can dance, skate, ride a bicycle, climb ladders and carry on the ordinary activities of life almost as well as his whole-limbed brother. In the service of the railroad there are many men fitted in this way with artificial legs or arms. Other parts of the body which can be successfully replaced are the ears, lips, nose, cheeks, eyes and palate. A great many men maimed in the European War were fitted with these artificial organs. A special wax is commonly used, although ears or noses of silver are not uncommon. In either case, of course, the organ is painted to resemble human flesh.

ARTILLERY SCHOOLS. See MILITARY EDUCATION.

ARTOIS (50° 30' N.; 2° 30' E.), former province, N. France; after belonging in turn to Flanders, France, Burgundy, Austria, and Spain, finally reverted to France in 1659.

ARTILLERY, name originally applied to any device for throwing projectiles in war, but after the invention of gunpowder restricted to cannon of all kinds, and later extended to include the organized body of men, horses, guns, and wagons—the 'artillery'—of a fighting force. Cannon were first used by the Moors in Spain in the 13th cent., perhaps earlier, and in the 14th cent. came into use all over western Europe. They were rude contrivances made in various ways, the larger guns ('bombards') being at first made of bars and rods of iron roughly welded together and reinforced by shrinking iron rings on to them. The name 'cannon' was at first given to long guns of small bore, cast on a mandril or bored out from a solid

casting. At first iron was used, and then brass, bronze (gun metal), and other alloys. Later, heavy iron guns were made by casting and boring. Stone balls were long in use; the iron cannon ball came later. For the lighter guns a breech-loading system came early into use, usually in the form of a 'chamber' or detachable breech-piece, to receive the powder and ball, and then be fixed to the gun by wedges and bolts. For a long time cannon were chiefly used for siege purposes. On the battlefield they could not be easily moved, and their fire was very slow, so that they mostly only fired a few shots at the opening of an engagement. Gustavus Adolphus, in the 17th cent., introduced light guns to supplement the fire of his infantry and to move with them. This was the real beginning of field artillery. Naval artillery was first intelligently used by the Eng. fleet in the Armada battles, Howard's ships avoiding close fighting and attacking the Spaniards with the fire of their heavy guns. Frederick the Great used the massed fire of guns on a small scale. Napoleon (an artillery officer) also largely developed it. Great masses of guns, brought up to short range, prepared the way for the decisive attack in many of his victories. The permanent grouping of guns in regularly organized batteries had already prepared the way for their efficient tactical use. In the second half of the 19th cent. artillery made marvellous progress, and began to dominate the battlefield. Napoleon III. introduced the rifled gun, with its longer range and more accurate fire. Armstrong, Whitworth, and Krupp produced the breech-loader. Armstrong developed first the heavy gun reinforced by coils of iron shrunk on to it, and Whitworth and Krupp the steel gun. The elongated explosive shell replaced the cannon ball, and shrapnel (originally invented during the Napoleonic wars) was improved, so that it could send down a deadly shower of bullets over a large space of ground. In the war of 1870 the Ger. artillery, superior to that of the French, and efficiently handled, decided the fate of battle on many occasions. It was first used to knock out the Fr. guns, then to shake the infantry, and clear the way for the decisive attack. Then came the invention of the quick-firing gun, a combination of devices for quick loading and an arrangement for fixing the gun carriage and making the gun itself recoil in a slide, compressing springs that automatically brought it back to firing position; so that, once laid on the target, it could be loaded and fired as quickly as the gunners could work the breech gear and handle the ammunition.

Such guns can for a brief period fire twenty shots a minute, so that several shells are in the air at the same time. High explosive shells were also introduced and guns of a weight that had hitherto limited their use to fortress, siege, and naval work, were brought into the field. Ranges in land warfare were extended to 10 miles. Indirect fire from concealed positions was largely adopted, the gunners firing from behind cover at a target they could not see, directing their aim by indications given by telephone or wireless from observation posts in advance, high positions closer at hand, or from observers in aeroplanes. The heavy batteries are made up each of four breechloading 60 prs.—long 5-in. guns. Howitzers are shorter guns for throwing a heavy shell at a high angle. The batteries of field howitzers are armed with 4.5 and 5-in. howitzers. During Great War, heavier howitzers up to 15-in. caliber were used in trench warfare on the Western front, and the Germans had a few howitzers of 16½ in. caliber. The Fr. field gun is the 75 mm. q.-f., with the recoil controlled by a compressed air device.

ARTS, AMERICAN FEDERATION OF, an organization of American artists, established in 1909. Its headquarters is at Washington, and it has a membership of about 6,000.

ARTS AND CRAFTS, term which first came into general use with the establishment of the Arts and Crafts Society in 1888. The society was the outcome of a feeling of discontent amongst many artistic workers, who considered that the decorative arts, apart from painting, were not sufficiently recognized. The cultivation of artistic craftsmanship owed much to the example and inspiration of William Morris and his associates, and arts and crafts exhibitions.

ARTS, MASTER OF, graduate of university who has passed examinations in literary subjects, or literary and scientific mixed. In some universities the A.M. degree is granted without further examination.

ARU ISLANDS, ARRU (5° 20' to 7° S., 134° to 135° E.), islands, Dutch East Indies. Pop. c. 21,000.

ARUM, European genus of monocotyledonous plants, order Araceae. *Arum maculatum*, the cuckoo-pint, or lords-and-ladies, is common in Britain.

ARUNDEL MARBLES, the first collection of ancient sculptures in Britain, formed by Thomas, Earl of Arundel (1624-7), and given by his grandson to Oxford Univ.

ARUNDELL OF WARDOUR, THOMAS ARUNDELL, 1ST BARON (c. 1562-1639); went abroad and served against the Turks under the Emperor Rudolph II., who in 1595 cr. him Count for his bravery at the battle of *Gran*; on his return cr. Baron A. of W., 1605.

ARUNDO, genus of reedlike grasses with almost woody stems, comprising six species, found throughout warmer parts of the world. The grass, which is like bamboo, is used for paper pulp, thatching, etc.

AREVAL BRETHREN, a Roman priesthood of great antiquity which survived till the 4th cent. A.D. They were twelve in number, and conducted the May festival (Ambarvalia), when hymns were sung to Ceres and the Lares of the fields.

ARVE (46° 5' N., 6° 25' E.), river, Savoy and Switzerland; receives in valley of Chamouni the Arveyron, which descends from glacier through cave known as 'Ice-Gates of Arveyron.'

ARYAN is a name given to the Indo-European family of languages, to which English belongs. It is a word of Sanskrit origin meaning *noble*, and was the name whereby the Old Hindus distinguished themselves from the less civilized peoples of India. The early Aryans were probably a community of tribes living in inland Russia. They evolved a primitive vocabulary which is the foundation of most of the literary languages of Europe, Persia and India. The names of the *sun*, *moon*, *stars*, of the simple parts of the body (e.g., *head*, *eye*), of the most intimate relationships (e.g., *father*, *mother*), and of the numbers up to ten, being found in various forms in most of the Indo-European languages, probably date from this early vocabulary. In course of time the Aryan community split up, some going E. into Persia and India, others W. into Europe, and in their new homes the various Indo-European languages developed. The following are the main groups of Indo European or Aryan languages: Indian (including Sanskrit, Pali, Hindustani, Bengali, and the Gipsy dialect), Iranian (including Persian), Celtic (Irish, Gaelic, Manx, Welsh, and Breton), Hellenic (Ancient and Modern Greek), Italic (Latin, French, Italian, Spanish, Portuguese, Provençal), Slavonic (Russian, Polish, Bohemian), Lettic (Old Prussian, Lithuanian), and Teutonic (Old Gothic, German, English, Dutch, Danish, Norse, and Swedish).

ASAFETIDA, a gum-resin obtained from root of a plant (*Ferula fetida*) chiefly growing in eastern Persia and Afghanistan; has an unpleasant and

characteristic odor; is used as a nervous stimulant, (e.g.) in hysteria, also as stimulant to the respiratory and alimentary tracts.

ASAPH, psalmist and prophet mentioned in *Bible* (*Chronicles* and *Psalms*); Asaphites afterwards assisted in service of Temple at Jerusalem.

ASA, son and successor of Abijah, King of Judah (c. 918-877 B.C.); opposed to idolatry.

ASBESTOS (unconsumable), amphibole mineral of fibrous texture or variety of serpentine occurring in N. America, S. Africa, Australia, and Europe, formerly sometimes woven into fabrics, now generally used as a fireproof and heat-retaining material for building, packing steam-pipes, etc., fabrics, filters for corrosives, electric insulating, and other purposes.

ASBURY PARK, a city of New Jersey, in Monmouth Co. It is on several railroads and on the Atlantic Ocean, 6 miles S. of Long Branch. It is one of the best known summer resorts around New York City, and contains many hotels and boarding houses, as well as many attractive private residences. It adjoins Ocean Grove on the N., from which it is separated by Wesley Lake. Both communities were originally laid out by members of the Methodist Episcopal Church for camp meetings and other purposes. Pop. 1920, 12,400.

ASBURY, FRANCIS (1745-1816), Eng. Methodist preacher; app. by Wesley to undertake missionary work in America; known as 'the Father of Amer. Methodism.'

ASCALON or **ASHKALON**, one of the five chief Philistine cities (31° 40' N., 34° 32' E.) on the Mediterranean, 39 m. S.W. of Jerusalem; Crusaders won a victory near by (1099); port filled up (1270). Now ruins. Excavations were carried on here in 1921-23.

ASCANIUS (class. myth.), son of Aeneas and Creusa; escaped from Troy with his father, and went with him to Italy; founded Alba Longa, from which sprang Rome. See Virgil's *Aeneid*.

ASCIDIANS, order of Tunicates (sea-squirrels), applied specially to those belonging to the genus *Ascidia* and related genera.

ASCENSION (8° S.; 14° 20' W.), lonely island of volcanic origin, south Atlantic; discovered by Portuguese on Ascension Day, 1501; Brit. since 1815; area, 34 sq. miles; fortified; has sanatorium on Green Mountain; abounds in turtles. Pop. c. 400.

ASCENSION, FEAST OF THE, Christian festival dating at least from IV. cent., forty days after Easter, in celebration of A. of Christ; always on Thursday.

ASCENSION, RIGHT, of a star is measured by arc of celestial equator between its declination circle and the first point of Aries (Vernal equinox). *Declination* is its distance from equator measured along arc of great circle (declination circle) passing through star and pole.

ASCETICISM, the practice of self-denial, often very severe, has been frequent in Christianity and other religions. It has taken many forms, abstinence from wine, flesh, and marriage, fasting, and infliction of self-tortures. It is related of St. James, traditional first bp. of Jerusalem and 'brother' of Christ, that he never anointed himself and never had a bath, and that he spent so long kneeling on the stone floor of the Temple that his knees became hard like a camel's. Abstinence from various meats (e.g. swine's flesh among Jews and beef among Hindus) rests often on primitive ideas of *taboo*—i.e., a certain animal was holy and akin to God and His people, and its flesh only eaten sacramentally, if at all. A. in Christianity was 'organized' in monasticism, but outside it has often been practised, especially in the early and mediæval Church and still in Catholicism where the Church has had sometimes to repress extreme developments. Thus by some even marriage was thought unclean. In Buddhism and other Oriental faiths, where the body and its passions must be subjugated, terrible austerities are practised.

ASCHAFFENBURG (49° 49' N., 9° 11' E.), cathedral town, Bavaria; castle (Johannisburg) was once residence of prince bp's of Mainz; manufactures paper, liqueurs, tobacco. Pop. 32,200.

ASCHEAM, ROGER (1515-68), Eng. author; b. Kirkby Wiske (Yorks.); s. of steward to Lord Scrope of Bolton; ed. in household of Sir Anthony Wingfield, and later at St. John's Coll., Cambridge. Here he devoted himself especially to study of Greek, received a fellowship, and became lecturer in Greek; was also proficient in archery, and his first work, *Toxophilus* (1545), dealt with that subject, and was dedicated to Henry VIII. He became univ. orator, and tutor to the Princess Elizabeth, and Latin sec. to Edward VI., Mary, and Elizabeth. His principal work, *The Scholemaster* (1570), was a treatise on the teaching of Latin.

ASCITES, an effusion of watery fluid into the abdominal cavity; non-inflammatory, and usually due to obstruction of the liver blood supply.

ASCLEPIADACEÆ, family of plants chiefly half shrub, half herb, mostly twiners; 1,500 species, chiefly tropical (African); *Dischidia* contains pitcher-plant; cow-plant of Ceylon yield useful milk; others used locally in tropics as cathartics, tonics, and emetics; not represented in native plants of Britain.

ASCOLI PICENO. (1) Prov., Italy, in the Marches, sloping N.E. from the central Appennines to the Adriatic. Area, 796 sq. m.; pop. 268,000. (2) Tn., cap. of above prov. (42° 51' N., 13° 35' E.), on Adriatic coast; anc. *Asculum Picenum*; burnt 89 B.C.; remains survive; cathedral; severe earthquake (1878); majolica and paper. Pop. 32,250.

ASCOT and **ASCOT HEATH**, race-course, Berks, England (51° 25' N., 0° 40' W.), 6 m. S.W. of Windsor. *Ascot Cup* (June; course, 2 m.), one of chief turf events.

ASGARD, heaven of Norse mythology; opposed to *utgarth*, abode of monsters, *midgarth*, abode of men; inhabited by the Æsir, of whom Odin is ancestor and chief; in A. Odin dwells at *Gladseim*, where is *Valhalla*, home of heroes slain in battle; Thor has *Thrutvang*; Balder, *Breidablik*; Freya, *Folkvang*; Ull, *Ydalir*; Vall, *Valaskjalf*; Saga, *Sokkvabekk*; Skadi, *Thrymheim*; Hlmdal, *Himinbjorg*; Forseti, *Glinir*; Njord, *Noatun*; Vidar, *Landvidi*.

ASH (*Fraxinus excelsior*), tree belonging to order Oleaceæ, grown for timber in Great Britain; other species occur in Europe, Asia, and N. America. The mountain a., or rowan, belongs to the pear and apple tribe of the order Rosaceæ.

ASH WEDNESDAY, first day of Lent; the custom of sprinkling ashes on heads of penitents that day still survives in the R.C. Church.

ASHANTI, inland dist., Gold Coast Colony, W. Africa (7° N., 1° 40' W.). Surface covered with wood; land cultivated in neighborhood of towns produces large crops of grain, tobacco, sugar, cocoa, and pine-apples; gums, dye-woods, and timber are also important. Chief tn., Kumasi. Chief rivers, Volta, Black Volta, Tana, Bia. Climate hot and damp.

History.—Early history is obscure; nation traditionally formed by tribes forced to emigrate southward by spread of Mohammedan Empire. First his-

torical record occurs early 18th cent., when Osai Tutu conquered neighboring tribes, and made Kumasi centre of his dominions. Later ruler, Osai Tutu Quamina, became involved in war with Britain as result of his depredations in Fantiland (1807-11). War again occurred (1873-74), when Wolseley defeated the Ashantis at Amoaful and took Kumasi; and in 1895-6, when King Prempeh was deposed and exiled. Prov. annexed by Britain (1901); governed by governor of Gold Coast or his representative.

Chief exports are cocoa, gold, and kola. Rubber is produced. The natives manufacture cotton goods, gold and silver work, earthenware; they are pure negroes. Principal religion is fetishism; polygamy is still practised. Ry. from coast to Kumasi. Area, 23,000 sq. m.; pop. 300,000.

ASHBURNHAM, JOHN (1603 - 71), Eng. Royalist, became treasurer and paymaster of the king's army; with him in prison, 1647; suspected unjustly of disloyalty, but restored to favor after the Restoration; M.P. for Sussex 1661-67.

ASHBURTON.—(1) (50° 31' N., 3° 44' W.), town, Devonshire, England; Stannary town since 1328. (2) (23° 15' S., 116° 15' E.), river, W. Australia; enters Exmouth Gulf. (3) (44° 3' S., 171° 48' E.), river, New Zealand; also called Hakatere.

ASHBURTON, ALEXANDER BARRING, BARON (1774-1848), Eng. politician and banker; M.P. (1806-35); cr. peer (1835); was commissioned to negotiate the arrangement at Washington (1842) of the 'Ashburton Treaty,' dealing with the suppression of slave trade, and defining the boundary line between Canada and Maine, etc.

ASHBY-DE-LA-ZOUCH (52° 44' N., 1° 26' W.), town, Leicestershire, Eng. Pop. 1911, 5000.

ASHER, Israelitish tribe called after the s. of Jacob and Zilpah (*Genesis* 30-32).

ASHES, the inorganic residue from the combustion of organic material.

ASHEVILLE, a city of Buncombe co., N.C., on the Southern Railroad. It is 275 miles west of Raleigh. It is famous as a winter and summer resort, especially for invalids from the northern States. Its high altitude and clear air make it ideal for this purpose. There are several important educational and public institutions. In the neighborhood is the Biltmore estate, established by George Vanderbilt, a portion of which is now a

Government reservation and constitute the Pisgah National Forest. Over 300,000 people visit Asheville yearly. Pop. 1920, 28,504; 1923, 31,000..

ASHINGTON (55° 10' N., 1° 34' W.), town, Northumberland, England. Pop. 25,000.

ASHLAND, a city and county seat of Ashland co., Ohio. It is on the Erie and other railroads and is about 50 miles S.W. of Cleveland. There are important manufactures, several banks and newspapers. Pop. 1920, 9,249.

ASHLAND, a city of Kentucky, in Boyd co. It is on the Chesapeake and Ohio and the Norfolk and Western railroads, and on the Ohio and Big Sandy rivers. It has important manufactures of pig iron, wire nails, steel products, leather, etc. The city has a handsome public library and several important buildings. Pop. 1920, 14,729.

ASHLAND, a borough of Schuylkill co., Pennsylvania. It is in the valley of the Mahanoy River. It is on several railroads. The town is the center of the great anthracite coal fields of the State and has important mining interests. There are also machine shops, foundries and factories. The State Miners Hospital is here, and there are banks, public buildings and several churches. Pop. 1920, 6,666.

ASHLAND, a city and county seat of Ashland co., Wisconsin. It is on Lake Superior and on several railroads. It is 80 miles east of Duluth. Ashland has one of the finest harbors on Lake Superior and in addition to the general lake traffic, it is the shipping port for the hematite ore of the great Gogebic Iron Range. There are large blast furnaces and other manufacturing establishments of great importance. Its institutions include Northland College and the North Wisconsin Academy. Pop. 1920, 11,334.

ASHLEY, a town in Luzerne co., Pa., near Wilkes-Barre and on the Central R.R. of New Jersey. Several railroad repair shops are established here, but the prime importance of the community rests on its being the center of a coal mining region, thus being a shipping point of that commodity. Pop. 1920, 5,601.

ASHLEY, WILLIAM JAMES (1860), Eng. economist; professor at Toronto and Harvard Univ.; prof. of Commerce in Birmingham Univ. since 1901; has pub. *History of English Woollen Industry* (1887), *English Economic History and Theory* (1888-93), *Adjustment of Wages* (1903), etc.

ASHMEAD - BARTLETT, ELLIS, (1881), an English writer and war correspondent. At the age of sixteen he accompanied his father, Sir Ellis Ashmead-Bartlett, to Turkey, during the Græco-Turkish War, and was taken prisoner by the Greeks. He distinguished himself as a war correspondent for London papers in the Boer War, in 1899, and in the Russo-Japanese War, in 1904. He was also at the front in the two Balkan Wars, during 1912-13, and served as correspondent for over a year during the early part of the World War. He has written many books on his experiences and observations, one of the best being *Some of My Experiences in the Great War* (1918).

ASHMOLE, ELIAS (1617-92), Eng. antiquary; b. Lichfield; ed. Oxford; founder of the Ashmolean Museum, Oxford; devoted much time to the study of astrology, and pub. *Theatrum Chymicum Britannicum, The Way to Bliss* (dealing with the 'philosopher's stone'); and a *History of the Order of the Garter*.

ASHOKAN RESERVOIR, a great reservoir for holding water, which forms a part of the great Catskill Aqueduct system. The reservoir is 12 miles west of Kingston, N.Y. and it receives the waters which supply New York City with from 500,000,000 to 600,000,000 additional gallons per day.

ASHTON-UNDER-LYNE (53° 29' N., 2° 5' W.), town, Lancashire, England; cotton-weaving, bleaching, dyeing, print works, machinery. Pop. 45,179.

ASHRAF, or **ASHREF**, tn., Persia (36° 44' N., 53° 32' E.), near S.E. corner of the Caspian Sea; silk and cotton goods; has remains of its past glory. Pop. c. 6,000.

ASHTABULA, a city of Ohio, in Ashtabula co. It is on Lake Erie and on several railroads and is about 55 miles N.E. of Cleveland. The city is in the center of an important agricultural and dairy region but is especially noted for receiving the largest amount of iron ore of any port in the United States. Its railroad and lake connections make it one of the most important ports on the Great Lakes. The city has many important industrial establishments and a large drydock and shipbuilding plant. Pop. 1920, 22,082.

ASHURST, HENRY F. (1875), a U.S. senator, b. in Winnemucca, Nev. Taking a special course in law and economics at the University of Michigan, he set up a law practice in Williams, Ariz. He served in the Arizona state legislature during 1897, 1899 and 1903, being speaker during 1899. In 1911 he

was sent to the U.S. Senate, where he has served continuously until 1923.

ASIA, the largest continent; bounded N. by Arctic Ocean, E. by Pacific, S. by Ind. Ocean, S.W. by Africa, W. by Europe; greatest length, c. 5,150 m.; breadth, c. 6,000 m.; area c. 17,000,000 sq. m. Shape may be described as quadrangular central core, with peninsulas projecting to S., and chain of islands running down E. coast; coast-line irregular; E. coast fringed by Sea of Okhotsk, with Kamchatka peninsula and Kurile Isles outside; Sea of Japan, with Jap. islands outside; Yellow and E. China Seas with Luchu Isles outside; S. China Sea with Philippines and Borneo outside. In S., Bay of Bengal and Arabian Sea are respectively E. and W. of India. E. Indies extend S.E. from mainland.

Relief.—In S.W. of continent is plateau called Pamir, where India, Afghanistan, Turkestan, and China meet, and whence great mt. chains run in all directions. Principal mt. system is Himalayas—highest point, Mt. Everest (29,002 ft.); chief range extends S.E. from Pamir to borders of China, there breaking into numerous ridges which traverse Burma and Malay Peninsula; while Kuen-Lun in N. Tibet is northern flank of system. Tian-Shan Mts. extend N.E. from Pamir to Mongolia; further N., Altai and other ranges extend eastwards across N. Mongolia and E. Siberia towards Sea of Okhotsk, forming northern boundary of Desert of Gobi, eastern boundary of which is formed by Khingan Mts. Mountain ranges also extend from Pamir S.W. through India and Afghanistan, and W. towards Caspian. Tableland of Tibet (alt. 10,000–17,000 ft.) lies N. of principal range of Himalayas, to S. of which is Ind. peninsula with tableland of Deccan (1,500–3,000 ft.). In S.W. is tableland of Arabia (2,500–7,000 ft.). Other plateaus are those of Iran, Armenia, and Asia Minor. Principal rivers are Ob, Yenisei, and Lena in N.; Amur, Hoang-Ho, and Yang-tse-Kiang in E.; Mekong, Irawadi, Brahmaputra, Ganges, Indus in S.; Euphrates and Tigris in S.W.; Syr Daria and Oxus (Amu Daria) to Sea of Aral. Largest lakes are Caspian Sea (partly in Europe), Sea of Aral, Lake Balkash, Lake Baikal, and Lob Nor (receives rivers of E. Turkestan). Chief lakes in Tibet, Dangka-Yum Nor and Tengri Nor. There are lowlands along western Caspian-Ob dist.; in Manchuria, China, Siam, Lower Burma; in curve formed by valleys of Ganges and Indus in N. India; and in valleys of Euphrates and Tigris.

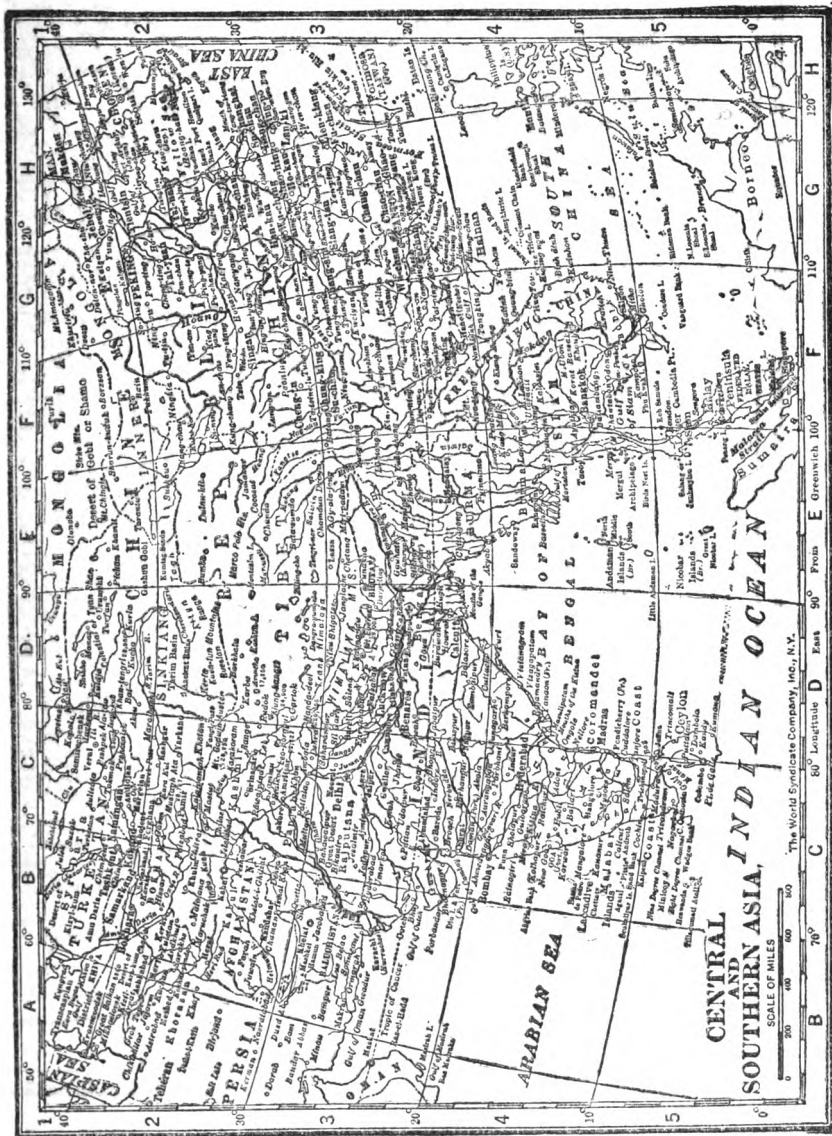
Climate varies greatly. Around Verkhoyansk, in N. of E. Siberia, is coldest

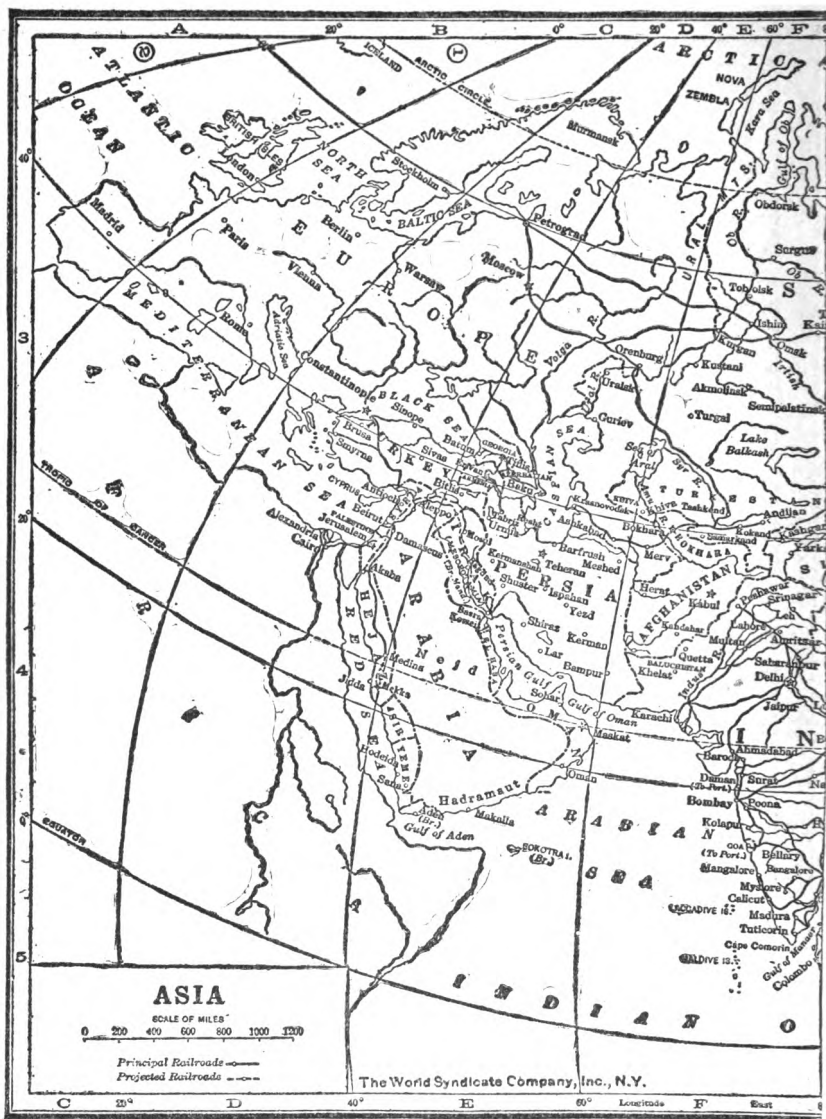
part of eastern hemisphere. Warmth gradually increases southward, annual isotherm of 10° passing roughly E. and W. from Bering Sea to mouth of Ob. of 20° from Sea of Okhotsk to S. end of Novaya Zemlya, of 30° from N. end of Saghalien to White Sea, of 40° from S. end of Saghalien to Petrograd, of 50° from middle of Japan to Sea of Azov, of 60° from S. end of Japan to Cape Baba, of 70° from Hong-Kong to Syria, of 80° (an irregular line) from middle of Philippines to Calcutta, thence round Himalayas, back by Gulf of Cambay, across the entrance of Pers. Gulf, and thence westward across middle of Arabia. Winter lines are everywhere curved in centre to S.; summer lines even more curved to N.E., following course of monsoons, which blow from N.E. from Oct. to March, and from S.W. from May to Oct. Rainfall is great where high ground intercepts wet winds, coastal regions and eastern Himalayas having over 90 in., and Indo-China peninsula 75; but there are rainless stretches in centre and on plateau from Persia westwards.

Flora.—Vegetation varies according to climate and lat. Dwarf willows and birches occur in *tundra* districts, N. of Arctic Circle, where also mosses and lichens are found. Chief trees are pine, larch, birch in Siberia, coniferous trees on Himalayas, oak, teak, deodar, sandalwood, palm, in India and Malaya. Tropical flowers occur on lower Himalayan slopes, rhododendrons higher up. In Syria and Asia Minor flora is Mediterranean in character. Central Asia produces vines, olive, fig, apple, and other European fruit trees; Jap. and Chin. vegetation occurs E. of Himalayas. In S.E. occur many varieties of indigenous plants—sugar-cane, cotton, pepper, areca, sago, banana, and coconut palms growing wild here, as well as many fruit trees and drug and rubber-producing plants. Bamboos are abundant in India. Cultivated plants include tea in Assam, Ceylon, China, Japan, etc.; coffee in Arabia, S. India; rice, maize, and cotton in monsoon lands. Date palms abound in oases.

Fauna includes camels, lions, elephants, tigers, bears, wolves, Arctic foxes, ermines, deer, marmots, monkeys, some marsupials (in Malaya), crocodiles, pythons, rhinoceroses, cheetahs; pheasants, ptarmigan, guilemot.

Geology.—Asia is considered to be of comparatively recent origin. Chief mt. systems consist mainly of granites; schists occur in Himalayas and Altai Mts., gneiss in Himalayas, volcanic rocks in India and Siberia; much of continent said to have been covered till comparatively recent date by sea, of







which Caspian and Aral Seas are traces; Himalayas apparently formed by upheavals occurring after Cretaceous period; island fringe of E. is volcanic. Minerals include gold, precious stones, coal, iron; petroleum found in Caucasus, Burma, and Sumatra.

History.—Earliest centers of civilization in Asia were Assyria and Babylonia, while China also has a civilization dating back many centuries before Christian era. In 7th cent. B.C. Persia conquered Assyria and Babylonia, and thenceforth held chief power till conquered by Alexander of Macedon, the division of whose kingdom caused wars between Egypt and Syria, these being both ultimately absorbed by Rome. In 3rd cent. A.D. the Persians struggled against the Romans for supremacy in Asia, and afterwards continued to struggle against the Byzantine Empire; ultimately destroyed by Mohammedan conquests in 7th cent. Caliphate, established by followers of Mohammed, for some time was chief power in Asia; in 10th cent. Mahmud of Ghazni established his independence and founded Mogul dynasty in India. Other independent empires were established by Seljuks in Asia Minor, and by Othman, founder of Ottoman Empire; and caliphate was finally overthrown by successors of Jenghiz Khan, conqueror of Central Asia and Northern China. Byzantine Empire was overthrown by Turks (1453). Since 16th cent. various European powers have established their influence in Asia. Russia conquered Siberia in 1580-84. India, after struggle between France and Britain, was secured by latter in 1763; Dutch in E. Indies; French in Indo-China.

Peoples.—Inhabitants of Asia form over half population of world; belong to five different groups—Mongolian, Caucasian, Malayan, Dravidian, Negroid. Mongolians, numerically greatest, forming about 1/10th of entire population, inhabit China, Japan, Tibet, N. Asia; Caucasians predominate in W. from Afghanistan to Asia Minor, and in India; Malayans in eastern peninsula and Eastern Archipelago; Dravidians in S. India and Ceylon; Negroid peoples in S.E. Asia and Philippine Islands. Other inhabitants are Russians, British, Jews, Arabs. Principal religion is Buddhism, but Hinduism prevails in India, Islam in Central and Western Asia. Asia was the cradle of all great world religions—Christianity, Mohammedanism, Buddhism, Jewish, and other faiths. Total pop. c. 900,000,000. See MAP ASIA.

ASIA (Gk. myth.), dau. of Oceanus and Thetis, and bride of Prometheus;

gave name to continent.

ASIA MINOR, or **ANATOLIA**, western peninsula, Asia (36°-42° N., 26°-42° E.), forming part of Turk. Empire; bounded N. by Black Sea, E. by Armenia and Persia, S. by Mediterranean and Syria, W. by Bosphorus, Sea of Marmora, Dardanelles, and Aegean; coast-line broken in W. Central tableland, 2,000-3,000 ft., bounded by mountain ranges N. and S.; has salt lakes. Elsewhere are fertile river valleys and waste strips; in S. is Plain of Adana. Climate extreme on plateau, temperate on Mediterranean. Chief rivers, Kizil Irmak, Sakaria. Roads are practically unknown; traffic dependent on horses, camels, mules. Railway mileage is c. 1,500. Hill slopes of N. are covered with trees—walnut, box, oak, beech, plane, ash. There are many sheep, goats, horses. Useful and precious metals are plentiful.

Ruling power in Asia Minor was held by Lydian kings in 7th cent. B.C.; came under control of Persia a cent. later, and was afterwards subdued in 334 B.C. by Alexander the Great, after whose death it was subdivided, greater part coming eventually to Seleucids, and kings of Pergamum; Rhodes became republic, and Bithynian kingdom was established; flourished under Romans from 1st cent. B.C.; less prosperous under Byzantine Empire; gradual annexation by Turks began 11th cent.; whole has belonged to Turkey since 1481. During World War main Turk. lines of communication were in Asia Minor; fighting between Turks and Russians in Armenia, 1916 and 1918. Smyrna occupied by British and Greeks, Oct. 1919. For territorial readjustments following World War, see under **TURKEY**.

Manufactures include silks, cottons, carpets, mohair, wine, soap, licorice, paste, copper utensils. Among imports are textiles, iron, coal, petroleum, sugar; among exports, grain, cotton, dried fruits, wine, oil, hides, mohair, tobacco, meerschaum, valonia, various ores, etc. Area, c. 200,000 sq. m.; pop. (recent estimate) 10,200,000, including Turks, Circassians, Jews, Arabs, and Greeks in W. See MAP ASIA.

ASIATIC QUESTION.—In many parts of the New World a serious Asiatic question has arisen owing to a rapid influx of Indians, Chinese, or Japanese, who, for one reason or another, have come to be regarded as undesirable immigrants. The main cause of anti-Asiatic feeling is generally to be found in the inability of the white man to compete in the labor and other markets on equal terms with the brown or yellow man.

ASIATIC RUSSIA, see **RUSSIA**.

ASIATIC TURKEY, see **TURKEY**.

ASKALON, EXCAVATION OF. See **ARCHAEOLOGY**.

ASKEW, ANNE (d. 1546), Eng. Prot. martyr; repudiated doctrine of transubstantiation; refused to recant, was racked, and burnt.

ASKHABAD (37° 55' N.; 58° 15' E.), **tan.**, Russian Central Asia. Pop. 41,700.

ASKJA, huge crater valley, Iceland (65° 2' N., 16° 46' W.); active in 1875.

ASMODEUS, Jew. name (of Persian origin) for a demon referred to in Book of *Tobit* as loving Sara, and the destroyer of her successive husbands; hence he is famous as the spirit which destroys conjugal happiness. He is often referred to by old writers, and figures in Le Sage's *Le Diable Boiteux*.

ASOKA (fl. 264-228 B.C.), Ind. emperor; adopting Buddhism, he spread its doctrines by missionaries and teachers and by edicts carved on stone pillars and rock; reign marks beginning of stone architecture and sculpture in India.

ASP, poisonous snake, Viperidæ family, common in Italy, and found as far N. as Sweden; only poisonous snake of northern region; 2 ft. long, bite seldom fatal. Not this snake but horned viper (*Vipera cerastes*) cause of Cleopatra's death.

ASPARAGUS, plant genus belonging to order Liliaceæ. *A. officinalis* cultivated for its edible stems; about a hundred other species occur in temperate parts of the Old World.

ASPASIA (fl. V. cent. B.C.), Greek woman who came to Athens from Miletus, entertained chief men of Athens in her house, won much fame for charm and intellectual gifts, and became mistress of Pericles, who was greatly attached to her; their s. was legitimized. A. was centre of free-thinking circle and vehemently attacked in literature of time, besides undergoing public prosecution.

ASPEN (*Populus tremula*), European and Siberian tree with slender leaf-stalks causing 'trembling' of the foliage. *P. trepidula* grows in N. America. Bark, containing salicin, is used medicinally.

ASPERN, village on bank of Danube, nearly opposite Vienna, Austria; scene of first serious defeat of Napoleon (May 21-2, 1809).

ASPHALT, MINERAL PITCH, blackish bituminous deposits formed by drying up of crude petroleum. Trinidad, Dead Sea, and Cuban deposits are ex-

ploited for manufacture of roofing felt, coating for floors, and black varnish. A. limestone from Val de Travers (Switzerland) is used as ingredient of concrete for pavements, etc.

ASPHYXIATING GAS, any gas poisonous to organic being, but more especially in reference to gases used for destructive purposes in warfare. Gas, as a military weapon, was first used on a big scale by the Germans in the Great War, but the practice was known among the Chinese far back in the beginning of their historic period. Chemicals were enclosed in glass or earthenware pots and, when thrown and shattered, liberated gases which at least rendered the enemy unconscious. These devices have been more commonly employed by the Chinese at sea, especially by pirates, and were generally known among seamen as 'stink pots.' Noxious gases were later used by the French, as late as 1850. During the Boer War the British employed shells charged with lyddite which, on bursting, would disable the foe by its overpowering fumes, and during the Russo-Japanese War, in 1904, both sides employed asphyxiating gases. The use of such weapons, however, even among military men, was much deprecated as tending toward uncivilized warfare, being regarded much as the poisoning of wells had been, or the maiming of prisoners. At the Hague Peace Conference, held in 1899, the practice was especially condemned, and no military establishment of any civilized nation was thought to include the use of gas as an arm of its service.

During the earlier battles of the World War, therefore, gases were not used by either side. It was not till the second battle of Ypres that the Germans suddenly swept the enemy trenches with vast clouds of poisonous gases that military men had to face their use as a reality. Nor did the fumes from the German trenches merely disable the enemy; a large proportion of the men subjected to this new feature of modern warfare were not only killed, but suffered the most intense agonies before expiring. A violent protest was, of course, immediately made by the Allied nations, to which the Germans replied, through the German legation in Berne, Switzerland, that the French were, as a matter of fact, already planning to use asphyxiating gases, and that the German armies had only forestalled them. This charge the French were unable to deny, but they replied that the gases they had intended using were of a less deadly character. As the Germans refused to desist from the use of gases, the Allies also adopted them as

a weapon, and during the rest of the World War they became a recognized means of combat for both sides. The deadliness of gases was somewhat checked at a later period by the use of gas masks, a device which was fitted over the head of the soldier in the front line trench, enabling him to strain the air necessary for breathing through material chemically treated, but in spite of this precaution the fatalities from 'gasing' formed a large proportion of the total. Of those who recovered from a lesser degree of asphyxiation, the lungs remained in a very delicate state, rendering them especially subjective to attack from tuberculosis.

ASFROMONTE (38° 5' N.; 15° 55' E.), mountain, Italy, 6420 ft.; Garibaldi wounded and captured here, 1862.

ASQUITH, HERBERT HENRY (1852), Eng. statesman; b. Morley, Yorkshire; educated at City of London School and Balliol, Oxford, where he took a first-class (Lit. Hum.) and became a fellow; called to bar (1876); came into special prominence during Parnell Commission; entered House of Commons as Liberal member for E. Fife (1886); moved amendment (1892) which brought about fall of Salisbury government; home secretary in new administration. On defeat of Liberals (1895) returned to bar; during S. African War was a leading Liberal Leaguer; strongest opponent of Chamberlain's tariff reform; chancellor of exchequer in Campbell-Bannerman's government (1905-8); prime minister (1908-16); formed coalition ministry (1915); alliance of Mr. Lloyd-George and his followers with Unionist members of cabinet led to his resignation (1916). In *debacle* of Liberal party at general election (Dec. 1918) lost seat for E. Fife, but during exclusion from Parliament made many speeches. In Feb. 1920 contested Paisley, and won the seat in a three-cornered fight by a majority of 2,834.

ASS, a general name for the genus *Asinus* of the horse tribe. It differs somewhat from the horse in having a tuft of hair at the end of its tail, in having no warts on its hind legs, and in the presence of stripes, which are absent in the domestic A. Its characteristics are long ears and an upright mane, together with a proverbial stupidity. The Egyptians used the head of an A. to signify the sign of extreme dullness. It is only fair to add on behalf of the A. that this celebrated stupidity is more superstitious than actual. Although the domestication of the A. took place at a very early date, the common 'donkey' was not

introduced into England till the time of Elizabeth. The animal is particularly adapted for transport purposes on account of its surprising hardihood, endurance, and docility when treated kindly. The usually wretched specimens seen in England are more the result of bad treatment than naturally so. In Arabia, Syria, and Egypt, among other places, its careful treatment has resulted in the evolution of an animal of remarkable value, for a Spanish he-ass is worth \$1000. The wild variety is much hunted in Persia, and its flesh greatly prized. Because of the presence of more sugar and less cheese in its milk, invalids take it with benefit. Its skin is manufactured into shagreen leather, and also used in the making of drums. The variety called albino, i.e. white, was used by the ancients on state occasions and reserved for the highly honored.

ASSAM, prov., including feudatory state of Manipur, in extreme N.E. of India (22° 30'-28° 16' N., 90°-97° 10' E.). Northern part lies along Brahmaputra valley, southern along Surma valley; between these two rivers lies hill district; chief mts., Himalayas in the N., Assam hills in the S.; large amount of forest ground and fertile land.

Assam was conquered by Burmese in late 18th cent. War between Burmese and British broke out (1823-4); resulted in cession of Assam to British (1826); incorporated with Eastern Bengal, because of unrest in Bengal (1903); separated again (1912).

Assam produces about two-thirds of tea grown in India; plantations covering 400,000 ac.; large deposits of coal; petroleum, iron, and limestone also worked; forests contain rubber trees, sal, and other hardwoods. Exports tea, jute, rice, timber, coal; imports woollen and cotton goods, salt, glass, earthenware, tobacco, opium, betel; traffic carried by river and railway; main local trade is with Bhutan. Animals found include rhinoceroses, elephants, tigers, monkeys, porcupines, innumerable kinds of birds, crocodiles, snakes. Inhabitants are dark-skinned and black-haired; majority are Hindus (50 per cent.), a large number of Mohammedans (25 per cent.), and Animists, small number of Christians, and Buddhists. Principal languages are Bengali and Assamese. Chief tn., Shillong, Area, 61,682 sq. m.; pop. 7,000,000. See MAP CENTRAL AND S. ASIA.

ASSASSIN, a murderer, hired or otherwise; particularly the murderer of a public person. The name is derived

from a secret society of murderers founded in Persia, in 1090, by Hassan ben Sabbah, who seized the fortress of Alamut, where he established the order, making the Sheikh el-Jebel ('old man of the mountain') the ruler-in-chief. The *fedais*, who were those appointed to carry out the murders, were first intoxicated with a narcotic preparation made from hemp (*hashish*). From Persia branches of the Order of Assassins spread into Syria and Asia Minor, and for two cents. continued their operations. The Crusaders became acquainted with its terrors, and among its most distinguished victims were Conrad of Montserrat and Count Raymond of Tripoli.

Assassinations.—Xerxes I., Artaxerxes III., and Darius III. of Persia were murdered; as were Julius Cæsar, the emperors Caligula and Domitian, Edward II. and Edward V. of England, James I. and James III. of Scotland, Henry III. and Henry IV. of France. Notable assassinations in 19th and 20th cents. are those of Tsars of Russia (1801 and 1881); U.S. presidents Lincoln (1865), Garfield (1881), McKinley (1901); Fr. president Carnot (1894); King Humbert of Italy (1900); Alexander I. of Serbia (1903); King and Crown Prince of Portugal (1908); King of Greece (1913). Recent assassinations are those of the Archduke Francis Ferdinand, heir-apparent of Austria (1914); Jean Jaurès, French Socialist (1914); Count Stuerghk, Austrian premier (1916); Rasputin (1917); Tsar Nicholas II., Tsarina Alexandra, and family (1917); Count Tisza, Hungarian premier (1918); President Sidonio Paes, Portugal (1918); Rosa Luxemburg and Karl Liebknecht (1919); Herr Eisner, president Bavarian republic (1919); Gen. Henry W. Wilson (1922); Dr. Walter Rathenau (1922); Djemal Pasha (1922); and Michael Collins (1922).

ASSAULT an unlawful attempt to apply force to the person of another, either directly or indirectly. It is also the act of using a gesture towards another, so as to give him reasonable grounds for believing that the person using such gesture meant to use actual force upon him. It includes also the act of depriving another person of his liberty. Common a.s. are punishable by fine or imprisonment; those which occasion serious bodily harm are punishable by long terms of penal servitude. Any person resisting or obstructing a police officer in the execution of his duty is liable, upon conviction, to two years' imprisonment with hard labor.

ASSAYING the quantitative determination of metals in ores and alloys, chiefly of iron, lead, copper, tin, mercury,

pottery, leather goods; hospital mosques, antimony, silver, and gold. See **METALLURGY**.

ASSEGAI, light wooden spear for throwing or stabbing used by the Zulus. *Assegai wood* is the product of *Curtisia jaginea*, found in Cape Colony, Natal, and the Transvaal. Most assegais are pointed with iron, and are now made of tough, heavy wood of *Grewia occidentalis*, the most highly prized of S. African woods; bark contains 13-14 per cent. of tannin.

ASSEMBLIES (Fr. *assemblee*; assembly, from Lat. *assimulare*, to bring together), fashionable periodical gatherings, still held in provinces; meeting of clerical synods, such as Westminster A. of Divines, General A. of Scottish Church; in Fr. history council summoned by king as A. of Notables; important A. of Notables, 1787-88, advised summoning of States General.

ASSESSMENT, official valuation of property or income for national or local government taxation purposes; also the amount of damages awarded in a court of law. Assessor (Late Lat. *assessor*, or regulator of taxation, by transference of meaning from *assessor*, assistant, from Lat. *assidere*, to sit beside).—(1) Official who assesses taxation. (2) Specialist called in to assist magistrate.

ASSIGN (Lat. *assignare*, to appropriate to), legal term for person to whom property is made over; conveyances in fee simple always made to guarantee his heirs, executors, administrators, and assigns.

ASSIGNATS, form of paper money current in France (1789-96); so called because originally they represented the price of land assigned to the holders. The National Assembly confiscated Church land and offered it for sale to municipalities, payment being accepted in paper notes. The rapid extension of the system made in time the value of the assignats nil. Superseded by mandats in 1796.

ASSIGNATION, to write and evidents and assignment to rents, clauses in Scot. conveyances assigning title-deeds and rents to grantee.

ASSINIBOINE. (1) Riv. of Canada; trib. of Red River, which it joins at 49° 52' N., 97° 12' W.; drains former dist. of Assinibola. (2) Peak, Rocky Mts. (51° N., 115° 30' W.), alt. 11,830 ft. *Assiniboines*, div. of Sioux Indians, now confined to small reservations in Canada and U.S.

ASSIUT, SIUT or ASYUT, (27° 9' N., 31° 12' E.).—(1) town, Egypt; site of

Nile barrage and lock; carved ivory. Pop. 51,500. (2) province, Upper Egypt; area, 772 sq. miles. Pop. 1,000,000.

ASSIZE COURTS IN ENGLAND, courts of justice held several times each year in every county. The king's commission to hold the assize is issued to His Majesty's judges, one of whom usually presides, but it may be directed also to some king's counsel, or other barrister, who then, if need be, takes the place of the judge. The commission is in several parts, the united effect of which is to empower the judge to try treasons and felonies, to clear the jails of all prisoners, and to try all civil causes. For the purpose of holding the assize the country is divided into eight circuits, viz.: the Western, Northern, Midland, Oxford, North-Eastern, South-Eastern, N. Wales, and S. Wales. London and Middlesex are not included in the circuit system. Civil cases are tried in the High Court of Justice, and criminal cases at the Central Criminal Court ('Old Bailey').

ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. See **ADVANCEMENT OF SCIENCE, ASSOCIATION FOR THE.**

ASSOCIATION OF AMERICAN COLLEGES AND EXPERIMENT STATIONS. See **AGRICULTURAL EDUCATION.**

ASSOCIATION OF IDEAS, a term first used by John Locke, and employed, in psychology, to describe the combination of states of mind with one another by what are known as the laws of a. Prominent among these laws are a. by similarity, and by contiguity. This method of logical speculation gave rise to what is known as the *Associationist school*, some of its principal later members being James Mill, J. S. Mill, and Prof. Bain. Associationists held that, given a sensation now, a previous sensation, by the law of similarity, is revived, and this bylaw of contiguity evokes the ideas that go to make up the object of perception.

ASSOCIATION OF LICENSED AUTOMOBILE MANUFACTURERS. See **AUTOMOBILE.**

ASSONANCE, kind of imperfect rhyme or word-echo consisting in the recurrence of the same vowel-sound (but not the final consonant or consonants), usually in the final feet of consecutive or alternate line of verse. Common with old Eng. writers, who would rhyme 'stand' with 'man.' In the ballad of *Sir Patrick Spens*, 'deep' is made to rhyme with 'feet.'

ASSUAN, or **ASWAN**, town, Upper Egypt (24° 5' N., 32° 55' E.), on r. bk. of Nile; ruins of temple erected by Ptolemy Euergetes; gateway of Alexander the Great; Nilometer on Elephanta I., etc.; tourist centre and winter resort. Pop. 16,100. *Assuan Dam* consists of solid granite barrage (one million tons), 2,187 yds. long; 180 sluices, and ladder of four locks for navigation; height raised in 1907 by nearly 24 ft.; holds up 2,423 millions of cub. metres of water. Construction involved submerging of island and temples of Philæ.

ASSUMPTION, FEAST OF, festival (Aug. 15) commemorative of tradition almost universally held (but not of faith) in R.C. Church, that the Virgin Mary's body was assumed after her death into heaven.

ASSUMPTION ISLAND (9° 44' S., 46° 30' E.), dependent island of Seychelles, Africa.

ASSUR (35° 32' N., 43° 15' E.), original capital, Assyria; site marked by Kaleh Sherghat, on Tigris; also name of god whose temple was there.

ASSUR-BANI-PAL, Assyrian king; after his f.'s death (668 B.C.) he subdued revolted provinces, but lost Egypt (660). His bro. (Babylonian king) declared war, but Babylon was starved into surrender (648 B.C.). When Assur-Bani-Pal d. (c. 626) his empire was already decaying.

ASSISI (43° 4' N., 12° 36' E.), cathedral town, Italy; birthplace of St. Francis, 1182; has Franciscan monastery and double church. Pop. 6,000.

ASSINIBOIA (50° 20' N., 107° W.), former name of territory now included in Saskatchewan (q.v.) province, Canada; a district in Rupert's Land prior to 1870.

ASSYRIA, anc. country lying N. of Babylonia (36° N., 43° E.), and forming part of Mesopotamia; named from Assur; became one of the most extensive empires of anc. world, comprising Babylonia, W. Media, Armenia, Syria, Palestine, and Egypt. Surface of country is high plain crossed by mts. and drained by river Tigris and its tribs.

History.—Gr. account of founding of state and its later cap. Nineveh by Ninos (eponymous character), husband of Semiramis, was derived from Pers. legends; Bible account of Assyria as colony of Babylonia is borne out by inscriptions; subject to Babylonia, 2250–1500 (?); succeeding period one of constant strife with Babylonia; c. 1270 B.C. Shalmaneser I., who changed cap. from Assur to Calah, greatly increased pres-

tige of Assyria. Tiglath-pileser I. (c. 1120 B.C.) gained control of great part of Babylonia, and again made Assur the cap. His successors lost control of Babylonia, which remained independent for several centuries. The cruel Assur-natsirpal (c. 860-833) carried fire and sword in all directions, subduing Aramæans and establishing Assyrian pre-eminence in the East. Nineveh, now the capital, increased in splendor with each succeeding ruler. Shalmaneser II., who succeeded Assur-natsirpal, also carried out successful campaigns; and in the following cent. Tiglath-pileser III. became king also of Babylonia. Under Sargon Assyrian empire reached its zenith; he subjugated Babylonia, defeated the Hittites, and made Judæa a vassal state. Sennacherib, his son, destroyed Babylon and carried on various wars; his son Esarhaddon (680-669) warred against Egypt, and was succeeded by his son Assur-bani-pal (king, 668-626), a great soldier who carried on various wars, burning the palace of his rebellious brother in Babylon. After his death Babylonia broke away and Assyria began to decline; empire ended with destruction of Nineveh by Medes, Babylonians, and Scythians in 607 B.C., after which Babylonia again became centre of empire. See BABYLONIA.

ASTARTE, ASHTAROTH, or ISH-TAR, Phœnician goddess, symbolized by the moon; represented the conceptive powers of nature, as Baal the generative. The rites connected with her worship at Tyre and Sidon were of a lascivious nature. A. is often confounded with Venus and other classical deities.

ASTER, genus of composite, generally herbaceous perennial plants, occurring in America, Europe, and Asia, many species being cultivated in gardens, (e.g.) Michaelmas daisies.

ASTHMA, disease characterized by sudden paroxysmal attacks of painful and distressful breathing, recurring at intervals. It is due to narrowing of the bronchial tubes, and previous lung disease, polypi, etc., and a neurotic history predispose to it. Certain atmospheric conditions, dusty particles, and reflex irritation, (e.g.) from alimentary system, excite attacks. Various inhalations, and lobelia, belladonna, and hyoscyamus are valuable in its treatment, while hypnotism has also been employed with benefit.

ASTI (44° 55' N., 8° 15' E.), town, Italy; birthplace of Alfieri; famous wine. Pop. 20,000.

ASTOR, famous Amer. family of Ger. origin, founded by (1) John Jacob

(1763-1848), who engaged in the fur trade; made a huge fortune in real estate in New York. (2) William Backhouse (1792-1875), eldest son of above, known as 'landlord of New York.' (3) John Jacob (1822-90). (4) John Jacob (1864-1912), great-grandson of the founder of the family; invented useful mechanical appliances; drowned in the *Titanic* disaster. (5) William Waldorf, 1st Viscount (1848-1919), only son of (3); settled in England; bought the *Pall Mall Gazette* and *Pall Mall Magazine*, and *Observer*; during Great War gave munificently to war funds; created baron (1916) and viscount (1917); (6) Waldorf Astor, 2nd Viscount (1879), eldest son of (5); educated Eton and Oxford; Parliament (1910-17); under-secretary to Local Government Board and to Ministry of Health; succeeded his father (Oct. 1919). (7) Nancy Witcher, Viscountess, wife of (6).

ASTOR, LADY NANCY WITCHER (1879), wife of Lord William Waldorf Astor, and a British M.P. (b. Danville, Va.). She is the daughter of Chiswell Dabney Langhorne and a member of an old Virginia family. In 1897 she married Robert Gould Shaw, of Boston, Mass., from whom she was divorced, in 1903. Three years later she married her present husband, then William Waldorf Astor, Jr. In 1919, when her husband succeeded to his father's title, and therefore gave up his seat in the House of Commons to enter the House of Lords, Lady Astor was nominated candidate (from Plymouth) for the vacancy, on a Coalitionist-Unionist platform. She was elected Nov. 28, 1919, being the first woman to enter Parliament. In the fall of 1922, at the elections attending the overturn of the Lloyd George Liberal Cabinet, she was again returned, as a Unionist. Lady Astor has paid several visits to her native country during the past few years.

ASTOR, (WILLIAM) VINCENT (1891), an American capitalist, b. in New York City. He is the son of the late John Jacob Astor. He was educated at St. George's School and at Harvard, (1911-1912). During the war against Germany he served in the U.S. Navy, first as ensign, later as lieutenant, seeing service in European waters. Among the many corporations in which he is financially interested and in which he is a director are the Western Union Telegraph Co. and the American Express Co.

ASTORIA, a city of Oregon, in Clatsop co., of which it is the county seat. It is on the Spokane, Portland and Seattle railroad, and on the Columbia River, about 100 miles northwest of Portland.

It has a large commerce and is connected with foreign and domestic ports by steamship lines. There is an excellent harbor and water front. Astoria is the center of an important salmon canning industry and also has iron works, lumber mills, and other industrial establishments. It has a custom house, post office, parks, library, and other important public buildings. A fort was established here by Lewis and Clarke, and later it was the site of a fur trading station built by John Jacob Astor in 1811. It was the first settlement in the valley of the Columbia River. Pop. 1920, 14,270.

ASTRAKHAN. (1) Government, S.E. European Russia, on Lower Volga. Area, 91,042 sq. m.; pop. 1,427,500 (Russians, Cossacks, Kalmucks, Kirghiz, Tartars, etc.). (2) City, cap. of prov., on l. bk. of Volga, 50 m. from its mouth; chief Caspian port; fish, caviare, petroleum, and dyed wool of newborn lambs (astrakhan). Exports: cotton goods, sugar, and manufactured articles to Persia, from which imports of cotton, fruit, rice, silk, and leather. Citadel; cathedral; archiepisc. palace; museums; technical schools, etc. Pop. 156,000. See MAP RUSSIA.

ASTROLOGY, study of the motions of heavenly bodies and their supposed influence on terrestrial events and human affairs. The science and art were first practised by the Chaldeans in Babylonia and Assyria, who spread their knowledge to Egypt. The ancient Greeks, and even more the Romans, were convinced of the possibility of divining the future by consulting the constellations. Arabian astrologers flourished in spite of much opposition by the orthodox Christian Church, and a. continued to exercise great influence on European scientists and statesmen until Copernicus, by proving definitely that the earth is not the centre of the universe gave the impetus which severed the science of the stars, astronomy, from the still persistent art of astrology.

ASTRONOMICAL PHOTOGRAPHY or ASTROPHOTOGRAPHY. The application of photography to astronomy may be considered one of the greatest advances made in the science. The recording, by hand, on paper, of astronomical observations, leaves room for serious personal error, whereas a photograph necessarily gives a picture which is both faithful and complete. In obtaining precise measurements of celestial bodies and their movements, photography is found to be of increasing value, while a further use of the camera is made in producing photographs of stellar spectra.

The first successful astronomical photograph is credited to an American astronomer, J. W. Draper, who produced photographs of the moon in the year 1840. Since that time there have been many notable accomplishments in this branch of the science. The planet Eros was discovered by photography, and this body is now known to be, with the exception of the moon, our nearest neighbor in space. Many comets have also been discovered and exact measurements of the distance between the earth and remote bodies have been made.

In the later years of last century, the English astronomer, Gill, conceived the idea of preparing a complete catalogue of the heavens, and in 1887 a meeting was called at Paris, by the French Government, at which delegates attended from all civilized countries. At this Astrographic Congress arrangements were made for putting Gill's suggestion into effect. Eighteen observatories were engaged in the colossal undertaking, which involves the exposure of over 44,000 plates. It is estimated that 20,000,000 stars will be photographed, 2,000,000 of which will be measured and recorded in the catalogue. Over thirty years will be required for the work which is now almost complete.

ASTRONOMY, the science dealing with the celestial bodies, their positions, apparent and real, their motions, and physical characteristics. At the same time it deals with the earth considered as a planet, and with its place in the planetary system; in this sense it may be said to include within itself the other sciences. Various divisions of the science are recognized: (1) practical astron., which is concerned with the apparent positions of celestial bodies; (2) theoretical astron., which deals with their motions; and (3) physical or descriptive astron., dealing with the physical characteristics of the stars and planets, and with their arrangement in space. From another point of view the science may be divided into two main branches, dealing with (1) the solar system, in which the earth is one planet among others, and (2) the stellar universe, in which the sun is but one star among millions.

(1) At the present time the *solar system* is known to consist of the central body, the *sun*, a great globe of intensely heated gaseous matter round which revolve the eight primary *planets*—six of which are centres of satellite-systems—about a thousand *asteroids* or minor planets, an indefinite number of *comets*, and myriads of *meteoric bodies*. The primary planets are divided into two groups: the inner planets—Mercury,

Venus, the Earth, and Mars—which are separated by the zone of asteroids from the outer planets, Jupiter, Saturn, Uranus, and Neptune. The outer planets are much larger than the inner. Jupiter is the largest planet in the solar system, and Mercury the smallest. Mercury and Venus have no satellites, the earth one (the moon), Mars two, Jupiter nine, Saturn ten, Uranus four, and Neptune one. In addition, Saturn is encircled by three concentric rings. The scale of the solar system has been ascertained through the measurement of *parallax*, the apparent displacement of a body due to a real change in the position of the observer. Thus, by observing the moon from the observatories of Greenwich and of the Cape, her distance has been found to be 239,000 miles. [The distances of several asteroids have been determined in like manner, and from these the distance of the sun—about 93,000,000 miles—has been inferred.

(2) The sun is only one star among myriads which compose the *stellar system*. According to the most recent estimates there are a thousand million stars. These are of all degrees of apparent brightness, but absolutely fall into two great classes, which have been named 'giants' and 'dwarfs,' the latter class—to which our sun belongs—being the most numerous. A considerable proportion of the stars are *double* or *triple*—two or even three suns being in revolution round their common centre of gravity. A large number, too, are *variable*, fluctuating in their light, some irregularly, but the majority periodically. From time to time *new*, or *temporary* stars, appear, rise to a maximum and then sink into obscurity. The stars have been classified according to their spectra into various 'types,' differing in temperature and physical condition; while careful study of their proper motions has revealed the existence of *star-streaming*, the majority of the stars belonging to one or other of two great streams. The *Milky Way*, or *Galaxy*, is the ground-plan of the stellar system, and the stars progressively increase in density as the *Galaxy* is approached. *Star-clusters* are outlying subordinate systems at great distances—the most distant known being situated at a distance from which light requires 220,000 years to travel. There are in addition hundreds of thousands of nebulae of various classes—in regular planetary and spiral. Nebulae of the first of these classes are masses of gaseous matter, while the spirals are believed by some astronomers to be like the clusters—that is, outlying systems of stars.

Astron. is by common consent the

oldest of the sciences; the celestial bodies have been observed since prehistoric times. Their daily movement in the direction E. to W., an apparent motion caused by the rotation of the earth upon its axis, is the most obvious and must have been the first to be observed. The next movements observed were those of the sun and moon among the stars; the former being an actual movement, but the latter apparent only, due to the revolution of the earth round the sun in the course of a year. The first practical use made of these movements was the measurement of *time*—the rotation of the earth giving the day; the phases of the moon the month; and the apparent revolution of the sun the year. Five planets or 'wandering stars' were also noted amongst the host of fixed stars, and from about 600 B.C. up to the time of Hipparchus (190–120 B.C.), Gr. astronomers made great efforts to reduce their seemingly irregular motions to some orderly system, it being first assumed that sun, moon, and planets must all move round the earth in circles at uniform speed. As this theory did not agree with observation, it was supposed that it was not the planet itself that moved in a circle around the earth, but the centre of another circle, and that the planet travelled in this latter *epicycle*, as it was termed. But this did not account for all these irregularities, and the first epicycle had to carry a second, and that a third. This system was named the 'Ptolemaic,' from Claudius Ptolemy who gave it its final development (A.D. 137).

By Copernicus (1473–1543) it was shown that a great simplification could be secured by supposing the sun fixed and the earth and all the planets to revolve round it. Kepler (1571–1630) found that the planets moved in *ellipses*, not circles, round the sun, which occupied one of the foci, and that the straight line joining the planet to the sun, the *radius vector*, passed over equal areas of space in equal periods of time. Further, that the cube of the distance of any planet bore in every case the same proportion to the square of the time of its revolution. These are known as Kepler's Three Laws, and Sir Isaac Newton (1642–1727) proved that they are a consequence of a single universal law of Gravitation—that every particle of matter attracts every other particle with a force varying inversely as the square of the distance between them, and directly as the product of the two masses. He further proved that a body traveling under the influence of this law must revolve in one of four closely allied curves known as *conic sections*, of which

the circle and ellipse are two.

The most brilliant triumph of gravitational astron. was achieved in 1846, when the great planet Neptune was discovered from the computations of Adams (1819-92) and of Leverrier (1811-77), who had independently predicted its position from the irregularities in the motion of Uranus, which had been discovered at the telescope by Sir William Herschel (1738-1822) in 1781. In the 19th cent. the rapid development of the telescope, the invention of the spectroscope and its application to astron., and the introduction of the photographic dry plate, resulted in an enormous extension of human knowledge concerning the solar system and the stellar universe. Chief among 19th cent. workers may be mentioned Bessel (1784-1846), Secchi (1818-78), Huggins (1824-1910), Schiaparelli (1835-1910), and Vogel (1842-1907). Since the beginning of the 20th cent. progress has been very rapid, chiefly as a result of the work of the great telescopes in America. For the recent Einstein theory of RELATIVITY, see art. under that head.

There was a marked revival in astronomical discoveries in 1921-3. One of the most significant features of recent progress is the increasing association between astronomy and the fundamental science of physics and astronomy. Work on the problem of the structure of the universe based on theories and relating to astronomy, made marked progress. Investigations made indicate that the universe is approximately 300,000 light years in diameter, and our sun is at least 50,000 light years from the center of the universe.

Phases of the Einstein theory of relativity were tested by astronomical experiments in 1922 and 1923. These experiments in the main supported the theory. In order to determine the matter of the deflection of the rays of light by the sun, Professor Michelson proposed to build a steel vacuum tube a mile long and a foot in diameter, and through this to despatch two rays of light in the opposite directions, the one in the direction of the earth's rotation and the other opposite thereto. If these rays do not arrive at their respective goals in identically the same length of time, the Einstein theory will have been shown to lack foundation in one of its vital aspects.

Over 2,000 hitherto unknown nebulae were discovered in 1922 at the Harvard University at Arequipa, Peru.

Professor Plaskett, in 1922, measured a binary, or twin star. He found one of these to be 75 times as heavy, and 15,000 times as bright as our sun; while the

other was 63 times as heavy and 12,000 times as bright. These stars burn with a heat of about 30,000° Fahrenheit.

ASTROPHYSICS, science of the physical and chemical constitution of heavenly bodies; grew into a distinct branch of astron. owing to the introduction of spectroscopy and the advance in photometry and photography.

ASTURIAS (43° 15' N., 5° 55' W.), old province, Spain, which in early times maintained independence against Moors; area, 4200 sq. miles; surface mountainous, rising to height of c. 9000 ft. in S.; chief town, Oviedo; cereals, fruits, horses; well-wooded. Pop. 700,000. The heir to the Span. throne takes the title Prince of A.

ASUNCION (25° 16' S., 57° 42' W.) capital, Paraguay; trades in leather, tobacco, sugar. Pop. 100,000.

ASYLUM, a sanctuary, or place of refuge, from which persons could not be dislodged except by committing an act of sacrilege. The word is now generally applied to homes for the insane. *Asylum, Right of*, the privilege of a country, or state, to give protection to fugitives from another country, or state, which of late years has been protected from abuse, to a great extent, by extradition treaties.

ASYMPTOTE (Gk. 'not meeting'); straight or curved line which approaches curved line without meeting it in finite distance; purely mathematical conception.

ATACAMA (27° S., 70° W.), province, Chile; area, 30,720 sq. miles. Pop. 1920, 48,413. *Atacama, Desert of* (24° S., 70° W.), mountainous region; rich in minerals.

ATACAMITE (Cu₂Cl(OH)₂), green, soft mineral, crystallizing orthorhombically, decomposition product of copper ores, found in Chile, S. Australia, and W. Africa.

ATAHUALPA, became Inca of Peru (1532) by dispossessing his bro. Huascar, who had succ. his f. Huayna Capac (1527), when A. had received Quito; during Span. conquest he was treacherously captured, and subsequently strangled (1533) by Pizarro's orders.

ATALANTA (classical myth.), Gk. maiden famed for her beauty and her fleetness of foot. Not being desirous to marry, she challenged her suitors to a race, death being the penalty of defeat. Hippomenes (Milanion in Arcadian version), one of these, won the race by dropping at intervals three golden apples given him by Aphrodite. A.

stopped to pick them up, and so was outstripped by her lover.

ATAVISM, inheritance from more or less remote ancestors of bodily or mental characteristics which have failed to appear in intervening generations; term now abandoned.

ATBARA, BAIR-AL-ASWAD, or **BLACK NILE**, riv., trib. of Nile, rising (12° 50' N., 36° 30' E.) in Abyssinia; joins Nile 17° 40' N., 34° E.; brings down highly fertilizing mud and causes annual floods of Nile; barrage; near confluence Kitchener defeated the Mahdists (April 8, 1898).

ATCHISON, a city and county seat of Atchison co., Kansas. It is on the Missouri river and on the Atchison, Topeka and Santa Fe, the Burlington, the Chicago, Rock Island and Pacific, and the Missouri and Pacific railroads. It is 25 miles N.W. of Leavenworth. From its river and railroad facilities the city is an important mining center and has a large trade in grain, flour, livestock and dressed meats. There are also manufactures of importance. Across the Missouri River is a notable bridge. There are banks, newspapers, and monthly periodicals. The State Soldiers' Orphans Home, and several collegiate institutions are here. Pop. 1920, 12,630.

ATÉ (classical myth.), the goddess of discord and all evil; dau. of Zeus, by whom she was flung out of Olympus by the hair, and left to dwell upon earth, where she incited mankind to all manner of wickedness.

ATHABASCA, ELK (59° 20' N., 109° W.), lake, Canada, and (57° 20' N., 111° 38' W.) river, Canada.

ATHALIA, Old Testament character, queen of Juda; dau. of Ahab and Jezebel; m. Jehoram, whose children she killed in order to obtain throne; of traditional cruelty; subject of Racine's great play *Athalie*.

ATHAPASCAN, scattered stock of N. Amer. Indians.

ATHANSIUS, ST. (293-373); Bishop of Alexandria (326); sided actively against Arius in Arian controversy; his refusal to readmit Arius to communion ultimately caused his banishment (335); returned (337), but was deposed on religious and political grounds (339). Although pronounced guiltless by the Great Council or Synod at Rome (340), he was not restored till 346. On three further occasions he suffered exile, but from 366 he continued his episcopal labors uninterruptedly.

ATHEISM, term applied to disbelief

in God, though often used vaguely and as term of abuse flung at those whose belief is different from the conventional; an agnostic, strictly a pure sceptic, should be distinguished from an atheist who definitely denies.

ATHELNEY (51° 3' N., 2° 56' W.), district, Somersetshire, England; formerly island; Alfred found safety here, 879.

ATHENA, PALLAS-ATHENE (classical myth.), one of the chief Olympian deities, called by Romans Minerva. No satisfactory explanation of name Athena, or Athene, is known, and Pallas is variously derived from name of a giant slain by A., from shield which she carried and used to swing about her (*pallo*, I swing) to ward off antagonistic influences, or from Attic district of Pallene, which was one seat of her worship. She is said to have sprung fully armed from head of Zeus, who had swallowed her mother, Metis, then pregnant. She was protector of heroes in war, patron of arts of peace, and guardian deity of city of Athens, which was probably named after her. The Parthenon, at Athens, was her chief temple, and contained world-renowned statue by Pheidias. The owl, the cock, and the serpent were sacred to her, as also was the olive tree.

ATHENÆUM, name given originally to buildings dedicated to the worship of Athena; later, a place where poets and scholars used to meet for reading purposes, and to instruct their pupils, such an institution having been built at Rome by the Emperor Hadrian. In modern times it is a name given to many clubs and literary institutions, and forms the title of a well-known literary journal.

ATHENÆUS, Gk. rhetorician, who lived about time of Commodus (II. cent.), and wrote *DiepnoSophiste*, a dialogue containing a vast amount of information upon a great variety of subjects connected with social life.

ATHENS, cap. of Greece (37° 58' N., 23° 43' E.), situated on small stretch of flat ground N.W. of Gulf of Ægina, between rivers Ilissus and Cephissus; 4½ m. by rail from its harbor at Piræus. Of recent years its industries—spinning of coarse cotton yarns, manufacture of coarse cotton cloths, making of silk and morocco leather—have been increasing in importance. Principal modern buildings are the royal palace, cathedral, academy, museum, observatory, univ., theatre, library. Modern town lies to N. of Acropolis. Pop. 300,700.

Ancient Athens was built on several low hills rising from Attic plain. Interest of old town lies chiefly in Acropolis, hill

in centre of city. Summit was occupied by many of finest buildings of world, some of which are wonderfully preserved. Near centre is Parthenon, chief temple of Athena, and finest example of Doric arch., built in 5th cent. B.C. Architects were Ictinos and Callicrates; whole was under supervision of Phidias, sculptor of chryselephantine statue of Athena, which formerly stood in the cella. Pediment groups are now among Elgin Marbles in Brit. Museum. Much of the temple was destroyed by shell explosion (1687). Erechtheion, N. of Parthenon, is finest example of Ionic arch., and has beautiful caryatids. The Propylaea, or great entrance hall, stood at western end, and was faced by colossal bronze statue of Athena, by Phidias. Other buildings were temple of Athena Niké (often called Wingless Victory), which has been reconstructed; and an old temple to Athena near Erechtheion, of which traces remain. Round base of Acropolis were many temples and other buildings, among which may be mentioned the Temple of Aesculapius, the Theatre of Dionysus, and the Odeum of Herod Atticus. In the city were also the Theseion and the Hephaestrum, respectively E. and W. of Agora, or marketplace, which in early and classical times was centre of municipal life; the Temple of Olympian Zeus, S.E. of Acropolis, and the Monument of Lysicrates. Traces of prehistoric civilization have been revealed by excavations, such as rock tombs and dwellings, early fortifications on Acropolis, and parts of wall built round citadel and called Pelasgicum.

History.—The state of Athens was traditionally founded by Theseus, c. 13th cent. B.C., and ruled by kings until c. 1100 B.C., afterwards by archons. In 4th cent. B.C., Archon Solon remodelled the constitution, laying foundations of future prosperity. Solon's constitution was practically set aside by Pisistratus, who ruled with great splendor and success as tyrant (560-527). His sons, Hippias and Hipparchus also ruled as despots; latter murdered, former expelled in 510, after which Cleisthenes framed a democratic constitution (506). Then various wars occurred, of which most important were those against Persia. Athenians defeated Persians at Marathon (490), and at Salamis (480). In latter year city was destroyed by Xerxes, but was presently rebuilt, surrounding walls being raised by Themistocles. About this time Athens became leader of Hellenist league against Persia, and became imperial state. Time of greatest glory was in second half of 5th cent. B.C., when, under leadership of Pericles, chief power in Greece was acquired, and maritime supremacy es-

tablished; this period was also marked by highest development of culture; plays of Euripides, Aristophanes, Sophocles produced; Parthenon built; sculpture found its highest expression in works of Phidias. Peloponnesian War broke out (432); ultimate result was conquest of Athens by Lacedaemonians; city taken by Lysander (405); ruled for short time by oligarchy of thirty, who were overthrown by Thrasybulus, and democracy restored (403); again flourished for a time; formed alliance with Thebes against Sparta (378), and again became most powerful state in Greece; opposed Philip of Macedon in Phocian War, after which war between Athens and Macedon broke out; defeated at Chaeronea (338 B.C.), and lost independence; politically unimportant from time of Alexander (d. 322) till Roman conquest (146 B.C.); city, which had retained independence, ultimately taken by Sulla (86 B.C.); prospered under Hadrian; twice invaded by Goths (A.D. 258 and 396); unimportant under Byzantines; became Frankish dukedom (1204); duchy (1258); given to Frederick of Aragon, King of Sicily (1312); taken by Nero Acciajuoli of Corinth (1386), by Turks (1458); remained under Turks until 1833, when became cap. of independent kingdom of Greece. Following the 'battle of Athens' (Dec. 1916), when the Allied forces occupied the city, King Constantine was forced by Allies to abdicate in favor of his son Alexander (June 1917).

ATHENS, a city of Georgia, the county seat of Clarke co. It is on the Oconee River, and on the Central of Georgia and other railroads, 67 miles east of Atlanta. Athens is the center of an important cotton growing region and has a large trade in cotton and other agricultural products. Its industries include cotton, woolen, cottonseed and hosiery mills, iron works and furniture factories. There are several important educational institutions including the University of Georgia, the State College of Agriculture and Mechanical Arts, the Lucy Cobb Institute, and the State Normal School. The city is well supplied with hotels and has several handsome public buildings. Pop. 1920, 16,748.

ATHENS, the county seat of Athens County, Ohio, 75 miles southwest of Columbus, on the Hocking River and on the Baltimore and Ohio R.R. Fruit is extensively raised in the surrounding region, but coal, mined in the vicinity is chiefly shipped from this point. The Ohio State University, the State Normal School and the State Asylum for the Insane are located here. Pop. 1920, 6,418.

from a secret society of murderers founded in Persia, in 1090, by Hassan ben Sabbah, who seized the fortress of Alamut, where he established the order, making the Sheikh el-Jebel ('old man of the mountain') the ruler-in-chief. The *fedais*, who were those appointed to carry out the murders, were first intoxicated with a narcotic preparation made from hemp (*hashish*). From Persia branches of the Order of Assassins spread into Syria and Asia Minor, and for two cents. continued their operations. The Crusaders became acquainted with its terrors, and among its most distinguished victims were Conrad of Montserrat and Count Raymond of Tripoli.

Assassinations.—Xerxes I., Artaxerxes III., and Darius III. of Persia were murdered; as were Julius Cæsar, the emperors Caligula and Domitian, Edward II. and Edward V. of England, James I. and James III. of Scotland, Henry III. and Henry IV. of France. Notable assassinations in 19th and 20th cents. are those of Tsars of Russia (1801 and 1881); U.S. presidents Lincoln (1865), Garfield (1881), McKinley (1901); Fr. president Carnot (1894); King Humbert of Italy (1900); Alexander I. of Serbia (1903); King and Crown Prince of Portugal (1908); King of Greece (1913). Recent assassinations are those of the Archduke Francis Ferdinand, heir-apparent of Austria (1914); Jean Jaurès, French Socialist (1914); Count Stuerghk, Austrian premier (1916); Rasputin (1917); Tsar Nicholas II., Tsarina Alexandra, and family (1917); Count Tisza, Hungarian premier (1918); President Sidonio Paes, Portugal (1918); Rosa Luxemburg and Karl Liebknecht (1919); Herr Eisner, president Bavarian republic (1919); Gen. Henry W. Wilson (1922); Dr. Walter Rathenau (1922); Djemal Pasha (1922); and Michael Collins (1922).

ASSAULT an unlawful attempt to apply force to the person of another, either directly or indirectly. It is also the act of using a gesture towards another, so as to give him reasonable grounds for believing that the person using such gesture meant to use actual force upon him. It includes also the act of depriving another person of his liberty. Common a.'s are punishable by fine or imprisonment; those which occasion serious bodily harm are punishable by long terms of penal servitude. Any person resisting or obstructing a police officer in the execution of his duty is liable, upon conviction, to two years' imprisonment with hard labor.

ASSAYING the quantitative determination of metals in ores and alloys, chiefly of iron, lead, copper, tin, mercury,

pottery, leather goods; hospital mosques, antimony, silver, and gold. See **METALLURGY**.

ASSEGAI, light wooden spear for throwing or stabbing used by the Zulus. *Assegai wood* is the product of *Curtisia jaginea*, found in Cape Colony, Natal, and the Transvaal. Most assegais are pointed with iron, and are now made of tough, heavy wood of *Grewia occidentalis*, the most highly prized of S. African woods; bark contains 13-14 per cent. of tannin.

ASSEMBLIES (Fr. *assembles*; assembly, from Lat. *assimulare*, to bring together), fashionable periodical gatherings, still held in provinces; meeting of clerical synods, such as Westminster A. of Divines, General A. of Scottish Church; in Fr. history council summoned by king as A. of Notables; important A. of Notables, 1787-88, advised summoning of States General.

ASSESSMENT, official valuation of property or income for national or local government taxation purposes; also the amount of damages awarded in a court of law. Assessor (Late Lat. *assessor*, or regulator of taxation, by transference of meaning from *assessor*, assistant, from Lat. *assidere*, to sit beside.)—(1) Official who assesses taxation. (2) Specialist called in to assist magistrate.

ASSIGN (Lat. *assignare*, to appropriate to), legal term for person to whom property is made over; conveyances in fee simple always made to guarantee his 'heirs, executors, administrators, and assigns.'

ASSIGNATS, form of paper money current in France (1789-96); so called because originally they represented the price of land assigned to the holders. The National Assembly confiscated Church land and offered it for sale to municipalities, payment being accepted in paper notes. The rapid extension of the system made in time the value of the assignats nil. Superseded by mandats in 1796.

ASSIGNATION, to *writs and evidents* and *assignment* to *rents*, clauses in Scot. conveyances assigning title-deeds and rents to grantee.

ASSINIBOINE. (1) Riv. of Canada, trib. of Red River, which it joins at 49° 52' N., 97° 12' W.; drains former dist. of Assiniboia. (2) Peak, Rocky Mts. (51° N., 115° 30' W.), alt. 11,830 ft. *Assiniboines*, div. of Sioux Indians, now confined to small reservations in Canada and U.S.

ASSIUT, SIUT or **ASYUT**, (27° 9' N.; 31° 12' E.).—(1) town, Egypt; site of

Nile barrage and lock; carved ivory, Pop. 51,500. (2) province, Upper Egypt; area, 772 sq. miles. Pop. 1,000,000.

ASSIZE COURTS IN ENGLAND, courts of justice held several times each year in every county. The king's commission to hold the assize is issued to His Majesty's judges, one of whom usually presides, but it may be directed also to some king's counsel, or other barrister, who then, if need be, takes the place of the judge. The commission is in several parts, the united effect of which is to empower the judge to try treasons and felonies, to clear the jails of all prisoners, and to try all civil causes. For the purpose of holding the assize the country is divided into eight circuits, viz.: the Western, Northern, Midland, Oxford, North-Eastern, South-Eastern, N. Wales, and S. Wales. London and Middlesex are not included in the circuit system. Civil cases are tried in the High Court of Justice, and criminal cases at the Central Criminal Court ('Old Bailey').

ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. See **ADVANCEMENT OF SCIENCE, ASSOCIATION FOR THE.**

ASSOCIATION OF AMERICAN COLLEGES AND EXPERIMENT STATIONS. See **AGRICULTURAL EDUCATION.**

ASSOCIATION OF IDEAS, a term first used by John Locke, and employed, in psychology, to describe the combination of states of mind with one another by what are known as the laws of a. Prominent among these laws are a. by similarity, and by contiguity. This method of logical speculation gave rise to what is known as the *Associationist school*, some of its principal later members being James Mill, J. S. Mill, and Prof. Bain. Associationists held that, given a sensation now, a previous sensation, by the law of similarity, is revived, and this bylaw of contiguity evokes the ideas that go to make up the object of perception.

ASSOCIATION OF LICENSED AUTOMOBILE MANUFACTURERS. See **AUTOMOBILE.**

ASSONANCE, kind of imperfect rhyme or word-echo consisting in the recurrence of the same vowel-sound (but not the final consonant or consonants), usually in the final feet of consecutive or alternate line of verse. Common with old Eng. writers, who would rhyme 'stand' with 'man.' In the ballad of *Sir Patrick Spens*, 'deep' is made to rhyme with 'feet.'

ASSUAN, or **ASWAN**, town, Upper Egypt (24° 5' N., 32° 55' E.), on r. bk. of Nile; ruins of temple erected by Ptolemy Euergetes; gateway of Alexander the Great; Nilometer on Elephantia I., etc.; tourist centre and winter resort. Pop. 16,100. *Assuan Dam* consists of solid granite barrage (one million tons), 2,187 yds. long; 180 sluices, and ladder of four locks for navigation; height raised in 1907 by nearly 24 ft.; holds up 2,423 millions of cub. metres of water. Construction involved submerging of island and temples of Philæ.

ASSUMPTION, FEAST OF, festival (Aug. 15) commemorative of tradition almost universally held (but not of faith) in R.C. Church, that the Virgin Mary's body was assumed after her death into heaven.

ASSUMPTION ISLAND (9° 44' S., 46° 30' E.), dependent island of Seychelles, Africa.

ASSUR (35° 32' N., 43° 15' E.), original capital, Assyria; site marked by Kaleh Sherghat, on Tigris; also name of god whose temple was there.

ASSUR-BANI-PAL, Assyrian king; after his f.'s death (668 B.C.) he subdued revolted provinces, but lost Egypt (660). His bro. (Babylonian king) declared war, but Babylon was starved into surrender (648 B.C.). When Assur-Bani-Pal d. (c. 626) his empire was already decaying.

ASSISI (43° 4' N., 12° 36' E.), cathedral town, Italy; birthplace of St. Francis, 1182; has Franciscan monastery and double church. Pop. 6,000.

ASSINIBOIA (50° 20' N., 107° W.), former name of territory now included in Saskatchewan (q.v.) province, Canada; a district in Rupert's Land prior to 1870.

ASSYRIA, anc. country lying N. of Babylonia (36° N., 43° E.), and forming part of Mesopotamia; named from Assur; became one of the most extensive empires of anc. world, comprising Babylonia, W. Media, Armenia, Syria, Palestine, and Egypt. Surface of country is high plain crossed by mts. and drained by river Tigris and its tribs.

History.—Gr. account of founding of state and its later cap. Nineveh by Ninos (eponymous character), husband of Semiramis, was derived from Pers. legends; Bible account of Assyria as colony of Babylonia is borne out by inscriptions; subject to Babylonia, 2250-1500 (?); succeeding period one of constant strife with Babylonia; c. 1270 B.C. Shalmaneser I., who changed cap. from Assur to Calah, greatly increased pres-

tige of Assyria. Tiglath-pileser I. (c. 1120 B.C.) gained control of great part of Babylonia, and again made Assur the cap. His successors lost control of Babylonia, which remained independent for several centuries. The cruel Assur-natsirpal (c. 860-833) carried fire and sword in all directions, subduing Arameans and establishing Assyrian pre-eminence in the East. Nineveh, now the capital, increased in splendor with each succeeding ruler. Shalmaneser II., who succeeded Assur-natsirpal, also carried out successful campaigns; and in the following cent. Tiglath-pileser III. became king also of Babylonia. Under Sargon Assyrian empire reached its zenith; he subjugated Babylonia, defeated the Hittites, and made Judæa a vassal state. Sennacherib, his son, destroyed Babylon and carried on various wars; his son Esarhaddon (680-669) warred against Egypt, and was succeeded by his son Assur-bani-pal (king, 668-626), a great soldier who carried on various wars, burning the palace of his rebellious brother in Babylon. After his death Babylonia broke away and Assyria began to decline; empire ended with destruction of Nineveh by Medes, Babylonians, and Scythians in 607 B.C., after which Babylonia again became centre of empire. See BABYLONIA.

ASTARTE, ASHTAROTH, or ISHTAR, Phœnician goddess, symbolized by the moon; represented the conceptive powers of nature, as Baal the generative. The rites connected with her worship at Tyre and Sidon were of a lascivious nature. A. is often confounded with Venus and other classical deities.

ASTER, genus of composite, generally herbaceous perennial plants, occurring in America, Europe, and Asia, many species being cultivated in gardens, (e.g.) Michaelmas daisies.

ASTHMA, disease characterized by sudden paroxysmal attacks of painful and distressful breathing, recurring at intervals. It is due to narrowing of the bronchial tubes, and previous lung disease, polypi, etc., and a neurotic history predispose to it. Certain atmospheric conditions, dusty particles, and reflex irritation, (e.g.) from alimentary system, excite attacks. Various inhalations, and lobelia, belladonna, and hyoscyamus are valuable in its treatment, while hypnotism has also been employed with benefit.

ASTI (44° 55' N., 8° 15' E.), town, Italy; birthplace of Alfieri; famous wine. Pop. 20,000.

ASTOR, famous Amer. family of Ger. origin, founded by (1) John Jacob

(1763-1848), who engaged in the fur trade; made a huge fortune in real estate in New York. (2) William Backhouse (1792-1875), eldest son of above, known as 'landlord of New York.' (3) John Jacob (1822-90). (4) John Jacob (1864-1912), great-grandson of the founder of the family; invented useful mechanical appliances; drowned in the *Titanic* disaster. (5) William Waldorf, 1st Viscount (1848-1919), only son of (3); settled in England; bought the *Pall Mall Gazette* and *Pall Mall Magazine*, and *Observer*; during Great War gave munificently to war funds; created baron (1916) and viscount (1917); (6) Waldorf Astor, 2nd Viscount (1879), eldest son of (5); educated Eton and Oxford; Parliament (1910-17); under-secretary to Local Government Board and to Ministry of Health; succeeded his father (Oct. 1919). (7) Nancy Witcher, Viscountess, wife of (6).

ASTOR, LADY NANCY WITCHER (1879), wife of Lord William Waldorf Astor, and a British M.P. (b. Danville, Va.). She is the daughter of Chiswell Dabney Langhorne and a member of an old Virginia family. In 1897 she married Robert Gould Shaw, of Boston, Mass., from whom she was divorced, in 1903. Three years later she married her present husband, then William Waldorf Astor, Jr. In 1919, when her husband succeeded to his father's title, and therefore gave up his seat in the House of Commons to enter the House of Lords, Lady Astor was nominated candidate (from Plymouth) for the vacancy, on a Coalitionist-Unionist platform. She was elected Nov. 28, 1919, being the first woman to enter Parliament. In the fall of 1922, at the elections attending the overturn of the Lloyd George Liberal Cabinet, she was again returned, as a Unionist. Lady Astor has paid several visits to her native country during the past few years.

ASTOR, (WILLIAM) VINCENT (1891), an American capitalist, b. in New York City. He is the son of the late John Jacob Astor. He was educated at St. George's School and at Harvard, (1911-1912). During the war against Germany he served in the U.S. Navy, first as ensign, later as lieutenant, seeing service in European waters. Among the many corporations in which he is financially interested and in which he is a director are the Western Union Telegraph Co. and the American Express Co.

ASTORIA, a city of Oregon, in Clatsop co., of which it is the county seat. It is on the Spokane, Portland and Seattle railroad, and on the Columbia River, about 100 miles northwest of Portland.

It has a large commerce and is connected with foreign and domestic ports by steamship lines. There is an excellent harbor and water front. Astoria is the center of an important salmon canning industry and also has iron works, lumber mills, and other industrial establishments. It has a custom house, post office, parks, library, and other important public buildings. A fort was established here by Lewis and Clarke, and later it was the site of a fur trading station built by John Jacob Astor in 1811. It was the first settlement in the valley of the Columbia River. Pop. 1920, 14,270.

ASTRAKHAN. (1) Government, S.E. European Russia, on Lower Volga. Area, 91,042 sq. m.; pop. 1,427,500 (Russians, Cossacks, Kalmucks, Kirghiz, Tartars, etc.). (2) City, cap. of prov., on l. bk. of Volga, 50 m. from its mouth; chief Caspian port; fish, caviare, petroleum, and dyed wool of newborn lambs (astrakhan). Exports: cotton goods, sugar, and manufactured articles to Persia, from which imports of cotton, fruit, rice, silk, and leather. Citadel; cathedral; archiepisc. palace; museums; technical schools, etc. Pop. 156,000. See MAP RUSSIA.

ASTROLOGY, study of the motions of heavenly bodies and their supposed influence on terrestrial events and human affairs. The science and art were first practised by the Chaldeans in Babylon and Assyria, who spread their knowledge to Egypt. The ancient Greeks, and even more the Romans, were convinced of the possibility of divining the future by consulting the constellations. Arabian astrologers flourished in spite of much opposition by the orthodox Christian Church, and a. continued to exercise great influence on European scientists and statesmen until Copernicus, by proving definitely that the earth is not the centre of the universe gave the impetus which severed the science of the stars, astronomy, from the still persistent art of astrology.

ASTRONOMICAL PHOTOGRAPHY or **ASTROPHOTOGRAPHY**. The application of photography to astronomy may be considered one of the greatest advances made in the science. The recording, by hand, on paper, of astronomical observations, leaves room for serious personal error, whereas a photograph necessarily gives a picture which is both faithful and complete. In obtaining precise measurements of celestial bodies and their movements, photography is found to be of increasing value, while a further use of the camera is made in producing photographs of stellar spectra.

The first successful astronomical photograph is credited to an American astronomer, J. W. Draper, who produced photographs of the moon in the year 1840. Since that time there have been many notable accomplishments in this branch of the science. The planet Eros was discovered by photography, and this body is now known to be, with the exception of the moon, our nearest neighbor in space. Many comets have also been discovered and exact measurements of the distance between the earth and remote bodies have been made.

In the later years of last century, the English astronomer, Gill, conceived the idea of preparing a complete catalogue of the heavens, and in 1887 a meeting was called at Paris, by the French Government, at which delegates attended from all civilized countries. At this Astrophographic Congress arrangements were made for putting Gill's suggestion into effect. Eighteen observatories were engaged in the colossal undertaking, which involves the exposure of over 44,000 plates. It is estimated that 20,000,000 stars will be photographed, 2,000,000 of which will be measured and recorded in the catalogue. Over thirty years will be required for the work which is now almost complete.

ASTRONOMY, the science dealing with the celestial bodies, their positions, apparent and real, their motions, and physical characteristics. At the same time it deals with the earth considered as a planet, and with its place in the planetary system; in this sense it may be said to include within itself the other sciences. Various divisions of the science are recognized: (1) practical astron., which is concerned with the apparent positions of celestial bodies; (2) theoretical astron., which deals with their motions; and (3) physical or descriptive astron., dealing with the physical characteristics of the stars and planets, and with their arrangement in space. From another point of view the science may be divided into two main branches, dealing with (1) the solar system, in which the earth is one planet among others, and (2) the stellar universe, in which the sun is but one star among millions.

(1) At the present time the *solar system* is known to consist of the central body, the *sun*, a great globe of intensely heated gaseous matter round which revolve the eight primary *planets*—six of which are centres of satellite-systems—about a thousand *asteroids* or minor planets, an indefinite number of *comets*, and myriads of *meteoric bodies*. The primary planets are divided into two groups: the inner planets—Mercury,

Venus, the Earth, and Mars—which are separated by the zone of asteroids from the outer planets, Jupiter, Saturn, Uranus, and Neptune. The outer planets are much larger than the inner. Jupiter is the largest planet in the solar system, and Mercury the smallest. Mercury and Venus have no satellites, the earth one (the moon), Mars two, Jupiter nine, Saturn ten, Uranus four, and Neptune one. In addition, Saturn is encircled by three concentric rings. The scale of the solar system has been ascertained through the measurement of *parallax*, the apparent displacement of a body due to a real change in the position of the observer. Thus, by observing the moon from the observatories of Greenwich and of the Cape, her distance has been found to be 239,000 miles. [The distances of several asteroids have been determined in like manner, and from these the distance of the sun—about 93,000,000 miles—has been inferred.]

(2) The sun is only one star among myriads which compose the *stellar system*. According to the most recent estimates there are a thousand million stars. These are of all degrees of apparent brightness, but absolutely fall into two great classes, which have been named 'giants' and 'dwarfs,' the latter class—to which our sun belongs—being the most numerous. A considerable proportion of the stars are *double* or *triple*—two or even three suns being in revolution round their common centre of gravity. A large number, too, are *variable*, fluctuating in their light, some irregularly, but the majority periodically. From time to time *new*, or *temporary* stars, appear, rise to a maximum and then sink into obscurity. The stars have been classified according to their spectra into various 'types,' differing in temperature and physical condition; while careful study of their proper motions has revealed the existence of *star-streaming*, the majority of the stars belonging to one or other of two great streams. The *Milky Way*, or *Galaxy*, is the ground-plan of the stellar system, and the stars progressively increase in density as the *Galaxy* is approached. *Star-clusters* are outlying subordinate systems at great distances—the most distant known being situated at a distance from which light requires 220,000 years to travel. There are in addition hundreds of thousands of nebulae of various classes—in regular planetary and spiral. Nebulae of the first of these classes are masses of gaseous matter, while the spirals are believed by some astronomers to be like the clusters—that is, outlying systems of stars.

Astron. is by common consent the

oldest of the sciences; the celestial bodies have been observed since prehistoric times. Their daily movement in the direction E. to W., an apparent motion caused by the rotation of the earth upon its axis, is the most obvious and must have been the first to be observed. The next movements observed were those of the sun and moon among the stars; the former being an actual movement, but the latter apparent only, due to the revolution of the earth round the sun in the course of a year. The first practical use made of these movements was the measurement of *time*—the rotation of the earth giving the day; the phases of the moon the month; and the apparent revolution of the sun the year. Five planets or 'wandering stars' were also noted amongst the host of fixed stars, and from about 600 B.C. up to the time of Hipparchus (190-120 B.C.), Gr. astronomers made great efforts to reduce their seemingly irregular motions to some orderly system, it being first assumed that sun, moon, and planets must all move round the earth in circles at uniform speed. As this theory did not agree with observation, it was supposed that it was not the planet itself that moved in a circle around the earth, but the centre of another circle, and that the planet travelled in this latter *epicycle*, as it was termed. But this did not account for all these irregularities, and the first epicycle had to carry a second, and that a third. This system was named the 'Ptolemaic,' from Claudius Ptolemy who gave it its final development (A.D. 137).

By Copernicus (1473-1543) it was shown that a great simplification could be secured by supposing the sun fixed and the earth and all the planets to revolve round it. Kepler (1571-1630) found that the planets moved in *ellipses*, not circles, round the sun, which occupied one of the foci, and that the straight line joining the planet to the sun, the *radius vector*, passed over equal areas of space in equal periods of time. Further, that the cube of the distance of any planet bore in every case the same proportion to the square of the time of its revolution. These are known as Kepler's Three Laws, and Sir Isaac Newton (1642-1727) proved that they are a consequence of a single universal law of Gravitation—that every particle of matter attracts every other particle with a force varying inversely as the square of the distance between them, and directly as the product of the two masses. He further proved that a body traveling under the influence of this law must revolve in one of four closely allied curves known as *conic sections*, of which

the circle and ellipse are two.

The most brilliant triumph of gravitational astron. was achieved in 1846, when the great planet Neptune was discovered from the computations of Adams (1819-92) and of Leverrier (1811-77), who had independently predicted its position from the irregularities in the motion of Uranus, which had been discovered at the telescope by Sir William Herschel (1738-1822) in 1781. In the 19th cent. the rapid development of the telescope, the invention of the spectroscope and its application to astron., and the introduction of the photographic dry plate, resulted in an enormous extension of human knowledge concerning the solar system and the stellar universe. Chief among 19th cent. workers may be mentioned Bessel (1784-1846), Secchi (1818-78), Huggins (1824-1910), Schiaparelli (1835-1910), and Vogel (1842-1907). Since the beginning of the 20th cent. progress has been very rapid, chiefly as a result of the work of the great telescopes in America. For the recent Einstein theory of RELATIVITY, see art. under that head.

There was a marked revival in astronomical discoveries in 1921-3. One of the most significant features of recent progress is the increasing association between astronomy and the fundamental science of physics and astronomy. Work on the problem of the structure of the universe based on theories and relating to astronomy, made marked progress. Investigations made indicate that the universe is approximately 300,000 light years in diameter, and our sun is at least 50,000 light years from the center of the universe.

Phases of the Einstein theory of relativity were tested by astronomical experiments in 1922 and 1923. These experiments in the main supported the theory. In order to determine the matter of the deflection of the rays of light by the sun, Professor Michelson proposed to build a steel vacuum tube a mile long and a foot in diameter, and through this to despatch two rays of light in the opposite directions, the one in the direction of the earth's rotation and the other opposite thereto. If these rays do not arrive at their respective goals in identically the same length of time, the Einstein theory will have been shown to lack foundation in one of its vital aspects.

Over 2,000 hitherto unknown nebulae were discovered in 1922 at the Harvard University at Arequipa, Peru.

Professor Plaskett, in 1922, measured a binary, or twin star. He found one of these to be 75 times as heavy, and 15,000 times as bright as our sun; while the

other was 63 times as heavy and 12,000 times as bright. These stars burn with a heat of about 30,000° Fahrenheit.

ASTROPHYSICS, science of the physical and chemical constitution of heavenly bodies; grew into a distinct branch of astron. owing to the introduction of spectroscopy and the advance in photometry and photography.

ASTURIAS (43° 15' N., 5° 55' W.), old province, Spain, which in early times maintained independence against Moors; area, 4200 sq. miles; surface mountainous, rising to height of c. 9000 ft. in S.; chief town, Oviedo; cereals, fruits, horses; well-wooded. Pop. 700,000. The heir to the Span. throne takes the title Prince of A.

ASUNCION (25° 16' S., 57° 42' W.) capital, Paraguay; trades in leather, tobacco, sugar. Pop. 100,000.

ASYLUM, a sanctuary, or place of refuge, from which persons could not be dislodged except by committing an act of sacrilege. The word is now generally applied to homes for the insane. *Asylum*, *Right of*, the privilege of a country, or state, to give protection to fugitives from another country, or state, which of late years has been protected from abuse, to a great extent, by extradition treaties.

ASYMPTOTE (Gk. 'not meeting'); straight or curved line which approaches curved line without meeting it in finite distance; purely mathematical conception.

ATACAMA (27° S., 70° W.), province, Chile; area, 30,720 sq. miles. Pop. 1920, 48,413. *Atacama*, *Desert of* (24° S., 70° W.), mountainous region; rich in minerals.

ATACAMITE (Cu₂Cl(OH)₂), green, soft mineral, crystallizing orthorhombically, decomposition product of copper ores, found in Chile, S. Australia, and W. Africa.

ATAHUALPA, became Inca of Peru (1532) by dispossessing his bro. Huascar, who had succ. his J. Huayna Capac (1527), when A. had received Quito; during Span. conquest he was treacherously captured, and subsequently strangled (1533) by Pizarro's orders.

ATALANTA (classical myth.), Gk. maiden famed for her beauty and her fleetness of foot. Not being desirous to marry, she challenged her suitors to a race, death being the penalty of defeat. Hippomenes (Milanion in Arcadian version), one of these, won the race by dropping at intervals three golden apples given him by Aphrodite. A.

stopped to pick them up, and so was outstripped by her lover.

ATAVISM, inheritance from more or less remote ancestors of bodily or mental characteristics which have failed to appear in intervening generations; term now abandoned.

ATBARA, BAIR-AL-ASWAD, or **BLACK NILE**, riv., trib. of Nile, rising (12° 50' N., 36° 30' E.) in Abyssinia; joins Nile 17° 40' N., 34° E.; brings down highly fertilizing mud and causes annual floods of Nile; barrage; near confluence Kitchener defeated the Mahdists (April 8, 1898).

ATCHISON, a city and county seat of Atchison co., Kansas. It is on the Missouri river and on the Atchison, Topeka and Santa Fe, the Burlington, the Chicago, Rock Island and Pacific, and the Missouri and Pacific railroads. It is 25 miles N.W. of Leavenworth. From its river and railroad facilities the city is an important mining center and has a large trade in grain, flour, livestock and dressed meats. There are also manufactures of importance. Across the Missouri River is a notable bridge. There are banks, newspapers, and monthly periodicals. The State Soldiers' Orphans Home, and several collegiate institutions are here. Pop. 1920, 12,630.

ATÉ (classical myth.), the goddess of discord and all evil; dau. of Zeus, by whom she was flung out of Olympus by the hair, and left to dwell upon earth, where she incited mankind to all manner of wickedness.

ATHABASCA, ELK (59° 20' N., 109° W.), lake, Canada, and (57° 20' N., 111° 38' W.) river, Canada.

ATHALIA, Old Testament character, queen of Juda; dau. of Ahab and Jezebel; m. Jehoram, whose children she killed in order to obtain throne; of traditional cruelty; subject of Racine's great play *Athalie*.

ATHAPASCAN, scattered stock of N. Amer. Indians.

ATHANSIUS, ST. (293-373), Bishop of Alexandria (326); sided actively against Arius in Arian controversy; his refusal to readmit Arius to communion ultimately caused his banishment (335); returned (337), but was deposed on religious and political grounds (339). Although pronounced guiltless by the Great Council or Synod at Rome (340), he was not restored till 346. On three further occasions he suffered exile, but from 366 he continued his episcopal labors uninterruptedly.

ATHEISM, term applied to disbelief

in God, though often used vaguely and as term of abuse flung at those whose belief is different from the conventional; an agnostic, strictly a pure sceptic, should be distinguished from an atheist who definitely denies.

ATHELNEY (51° 3' N., 2° 56' W.), district, Somersetshire, England; formerly island; Alfred found safety here, 879.

ATHENA, PALLAS-ATHENE (classical myth.), one of the chief Olympian deities, called by Romans Minerva. No satisfactory explanation of name Athena, or Athene, is known, and Pallas is variously derived from name of a giant slain by A., from shield which she carried and used to swing about her (*pallo*, I swing) to ward off antagonistic influences, or from Attic district of Pallene, which was one seat of her worship. She is said to have sprung fully armed from head of Zeus, who had swallowed her mother, Metis, then pregnant. She was protector of heroes in war, patron of arts of peace, and guardian deity of city of Athens, which was probably named after her. The Parthenon, at Athens, was her chief temple, and contained world-renowned statue by Pheidias. The owl, the cock, and the serpent were sacred to her, as also was the olive tree.

ATHENÆUM, name given originally to buildings dedicated to the worship of Athena; later, a place where poets and scholars used to meet for reading purposes, and to instruct their pupils, such an institution having been built at Rome by the Emperor Hadrian. In modern times it is a name given to many clubs and literary institutions, and forms the title of a well-known literary journal.

ATHENÆUS, Gk. rhetorician, who lived about time of Commodus (II. cent.), and wrote *DiepnoSophistæ*, a dialogue containing a vast amount of information upon a great variety of subjects connected with social life.

ATHENS, cap. of Greece (37° 58' N., 23° 43' E.), situated on small stretch of flat ground N.W. of Gulf of Ægina, between rivers Ilissus and Cephissus; 4½ m. by rail from its harbor at Piræus. Of recent years its industries—spinning of coarse cotton yarns, manufacture of coarse cotton cloths, making of silk and morocco leather—have been increasing in importance. Principal modern buildings are the royal palace, cathedral, academy, museum, observatory, univ., theatre, library. Modern town lies to N. of Acropolis, Pop. 300,700.

Ancient Athens was built on several low hills rising from Attic plain. Interest of old town lies chiefly in Acropolis, hill

in centre of city. Summit was occupied by many of finest buildings of world, some of which are wonderfully preserved. Near centre is Parthenon, chief temple of Athena, and finest example of Doric arch., built in 5th cent. B.C. Architects were Ictinos and Callicrates; whole was under supervision of Pheidias, sculptor of chryselephantine statue of Athena, which formerly stood in the cella. Pediment groups are now among Elgin Marbles in Brit. Museum. Much of the temple was destroyed by shell explosion (1687). Erechtheion, N. of Parthenon, is finest example of Ionic arch., and has beautiful caryatids. The Propylæa, or great entrance hall, stood at western end, and was faced by colossal bronze statue of Athena, by Pheidias. Other buildings were temple of Athena Niké (often called Wingless Victory), which has been reconstructed; and an old temple to Athena near Erechtheion, of which traces remain. Round base of Acropolis were many temples and other buildings, among which may be mentioned the Temple of Æsculapius, the Theatre of Dionysus, and the Odeum of Herod Atticus. In the city were also the Theselon and the Hephaestrum, respectively E. and W. of Agora, or marketplace, which in early and classical times was centre of municipal life; the Temple of Olympian Zeus, S.E. of Acropolis, and the Monument of Lysicrates. Traces of prehistoric civilization have been revealed by excavations, such as rock tombs and dwellings, early fortifications on Acropolis, and parts of wall built round citadel and called Pelasgicum.

History.—The state of Athens was traditionally founded by Theseus, c. 13th cent. B.C., and ruled by kings until c. 1100 B.C., afterwards by archons. In 4th cent. B.C., Archon Solon remodelled the constitution, laying foundations of future prosperity. Solon's constitution was practically set aside by Pisistratus, who ruled with great splendor and success as tyrant (560-527). His sons, Hippias and Hipparchus also ruled as despots; latter murdered, former expelled in 510, after which Cleisthenes framed a democratic constitution (506). Then various wars occurred, of which most important were those against Persia. Athenians defeated Persians at Marathon (490), and at Salamis (480). In latter year city was destroyed by Xerxes, but was presently rebuilt, surrounding walls being raised by Themistocles. About this time Athens became leader of Hellenist league against Persia, and became imperial state. Time of greatest glory was in second half of 5th cent. B.C., when, under leadership of Pericles, chief power in Greece was acquired, and maritime supremacy es-

tablished; this period was also marked by highest development of culture; plays of Euripides, Aristophanes, Sophocles produced; Parthenon built; sculpture found its highest expression in works of Pheidias. Peloponnesian War broke out (432); ultimate result was conquest of Athens by Lacedæmonians; city taken by Lysander (405); ruled for short time by oligarchy of thirty, who were overthrown by Thrasybulus, and democracy restored (403); again flourished for a time; formed alliance with Thebes against Sparta (378), and again became most powerful state in Greece; opposed Philip of Macedon in Phocian War, after which war between Athens and Macedon broke out; defeated at Chæronea (338 B.C.), and lost independence; politically unimportant from time of Alexander (d. 322) till Roman conquest (146 B.C.); city, which had retained independence, ultimately taken by Sulla (86 B.C.); prospered under Hadrian; twice invaded by Goths (A.D. 258 and 396); unimportant under Byzantines; became Frankish dukedom (1204); duchy (1258); given to Frederick of Aragon, King of Sicily (1312); taken by Nero Acciajuoli of Corinth (1386), by Turks (1458); remained under Turks until 1833, when became cap. of independent kingdom of Greece. Following the 'battle of Athens' (Dec. 1916), when the Allied forces occupied the city, King Constantine was forced by Allies to abdicate in favor of his son Alexander (June 1917).

ATHENS, a city of Georgia, the county seat of Clarke co. It is on the Oconee River, and on the Central of Georgia and other railroads, 67 miles east of Atlanta. Athens is the center of an important cotton growing region and has a large trade in cotton and other agricultural products. Its industries include cotton, woolen, cottonseed and hosiery mills, iron works and furniture factories. There are several important educational institutions including the University of Georgia, the State College of Agriculture and Mechanical Arts, the Lucy Cobb Institute, and the State Normal School. The city is well supplied with hotels and has several handsome public buildings. Pop. 1920, 16,748.

ATHENS, the county seat of Athens County, Ohio, 75 miles southwest of Columbus, on the Hocking River and on the Baltimore and Ohio R.R. Fruit is extensively raised in the surrounding region, but coal, mined in the vicinity is chiefly shipped from this point. The Ohio State University, the State Normal School and the State Asylum for the Insane are located here. Pop. 1920, 6,418.

ATHERTON, GERTRUDE FRANK-LIN (1859), Amer. novelist, began publishing in 1886. Most recent of many works: *The Conqueror* (1902), *The Gorgeous Isle* (1908), *Tower of Ivory* (1910), *Julia France and her Times* (1912), *Perch of the Devil*, and *California* (1914).

ATHERTON, PERCY LEE (1871), an American composer, b. in Boston, Mass. Graduating from Harvard, in 1893, he studied music abroad, under Rheinberger, in Germany, and under Sgambati, in Rome. He gained his first recognition by writing the music to the comic opera *The Heir Apparent* and later *The Maharaja*, the latter in 1900. Among his other works are many orchestral sketches, sonatas, pianoforte pieces and a large number of solo songs.

ATKINSON, ALFRED (1879), an American college president, b. in Seaford, Ont., Canada. After studying in an agricultural college in Canada, he came to the United States, in 1902, and began teaching, first in the Iowa State College, specializing in agricultural chemistry. Since 1919 he has been president of Montana State College. During the war against Germany he was State Food Controller. He wrote a great number of bulletins covering the work of agricultural experiment stations.

ATKINSON, ELEANOR, an American author, b. in Rensselaer, Ind. She graduated from the Normal Training School, in Indianapolis, after which she was for four years a teacher in Indianapolis and Chicago. In 1889 she became connected with the Chicago Tribune as a special writer, becoming popular under the pen name of Nora Marks. At one time she was editor of *The Little Chronicle*, of Chicago. Among her many books are *Mamzelle Fifine* (1903); *The Boyhood of Lincoln* (1908); *Lincoln's Love Story* (1909); *Hearts Undaunted* (1917), and *The Magic Casement* (1922).

ATKINSON, WILLIAM WALKER (1862), an American writer, b. in Baltimore, Md. Finishing a public school education, he went into private business, in 1882, then, studying for the bar, began to practice in Pennsylvania, in 1894. Six years later he became associate editor of *Suggestion*, a Chicago publication, then, in 1901, editor of *New Thought*. His works, largely dealing with subjects relating to self control through the subconscious mind include *Thought Force* (1900); *Self Healing* (1907); *The New Psychology* (1909); *Suggestion and Auto-Suggestion* (1909); and *The Mind and How to Use It* (1911).

ATHLETICS, embracing all games or displays of physical strength and skill, outdoor or indoor. Such contests or exercises may either be for pastime or for muscular growth and take the various known forms of field and track games or indoor gymnastics. In the United States, whose population has largely inherited all the love of sport engendered by their northern European forbears, the pursuit of athletic games has become one of the most vital manifestations of the national spirit, which aspires to triumph in every field it enters. In running and walking, cross country endurance tests and marathons, hurdles, high and broad jumping, vaulting, hammer and weight throwing, and putting the shot, in rowing, sculling, lawn tennis, polo and golf, in gymnastic displays by the use of Indian clubs, dumbbells, parallel and horizontal bars, weight-lifting, rope climbing, and other pastimes, American athletes have achieved a high excellence, and several are conspicuous as world champions.

The early Greeks fathered the development of athletics. Their influence on the human love of achievement in different physical tests has been so enduring down the ages that the modern International Olympic games reflect certain features of those practised by them in the heyday of their power. Then, as now, there were professional athletes, trained from boyhood like acrobats, and early broken in to endure a discipline of Spartan vigor, systematic exercises, abstemious habits of living and a cultivation of a strong personality manifested by self-mastery, initiative and courage. In later days of the ancients, the athlete appears here and there to have become a huge mass of flesh and muscle, to judge from mosaics and statues of Greek and Roman pugilists which have come down to us. In ancient Rome, incidentally, professional athletes formed incorporated organizations.

The World War caused a curtailment of athletic activities, especially in the postponement of the International Olympic games. The first of these contests held in the post-war period took place in the Pershing Stadium in France in the summer of 1919, when United States competitors achieved front rank in the track and field events the games comprised, scoring 92 points. France following second with 12 points. This triumph of American athletes signalized a similar supremacy in other fields of sport, notably in lawn tennis, golf and sculling. The post-war period, in fact, found the United States especially eminent in the world of athletes, perhaps in part because the war's drain of

man-power in other countries had depleted their athletic centers of outstanding contestants. However that may be, one has only to glance at the American performances for 1922 as related in athletic records to perceive that they could not be readily matched by the best competitors other countries could produce in normal times.

In the year named amateur and professional sports throughout the country and internationally continued to grow in interest, both from the spectators' and competitors' viewpoint. Every section of the country displayed a development in all forms of games and a heightened enthusiasm therein. National golf and tennis championships drew great crowds, while football games, especially those of intersectional interest, filled large stadiums with fervent onlookers.

Lawn tennis competitions with Australian players for the famous Davis Cup resulted in its retention by the United States, due to the extraordinary mastery of the game displayed by William T. Tilden and Wm. M. Johnston, the two leading American defenders. In golf American experts took part in British championship events, while British players competed in the United States. One American golfer, Walter Hagen, specially left his mark on the game by carrying off the British open championship. The American Golf Championship for 1922 was won by G. Sarazen. Another victory of equal note in wresting a similar championship from a British holder was the sculling achievement of Walter M. Hoover, who, at the Henley Regatta, defeated his competitor, J. Beresford, and thus became the world's amateur champion sculler.

In the feudal ages athletic tendencies, influenced by the Normans and the heritage of physical prowess they derived from the Vikings, took the form of tournaments and jousts among the nobles and primitive sports with clubs and bucklers among the yeomen on the village green. Such pursuits have their periods, for early athletics, in the changing eras of Europe, was subject to ups and downs, now decaying, then reviving. A decline in sports followed the waning of the age of chivalry, when muscular feats and the cultivation of physical strength became rarer. In England Henry VII. revived sports by establishing competitions with prizes, and in due time proficiency in the games of the period became a necessary accomplishment of a man of fashion until the revolution period. Then the influence of puritanism and of the dissolute Stuart regime alike tended to kill the old athletic spirit except in the country villages. Until

the early part of the nineteenth century, devotion to athletic sports lay in the twilight. Naturally the moral and physical condition of English youth suffered by this almost extinction of manly games.

The renaissance of English athletics set in among all classes of sports about 1850, aided in no small degree by the cult of 'muscular Christianity,' as eloquently espoused by Charles Kingsley and like social reformers. The universities, military colleges and the great public schools became the centers of a revival in outdoor sports that produced a series of periodic contests for championships which have been continued down to the present, and also brought into being the governing power in British sports, the Amateur Athletic Association.

In the United States athletics began to emerge into popular favor in the seventies of the last century. A little later the need of regulating organizations caused the formation of a national association of amateur athletes which was the forerunner of the Amateur Athletic Union, the chief controlling authority at present. As in England, the most active sport centers were the colleges, universities, and specially formed clubs. Contests between them grew in such numbers and frequency, and spread such a network of competing events over the country that the need of grading and classification became imperative if intercollegiate and other games were to be conducted on satisfactory lines. Accordingly the Intercollegiate Association of Amateur Athletes in America supervises intercollegiate athletics, embracing track and field games, while the Amateur Athlete Union controls contests in basketball, billiards, boxing, fencing, gymnastics, handball, hurdle, racing, jumping, la croasse, pole vaulting, putting the shot, throwing the discus, hammer and weights, running, swimming, tugs of war, walking and wrestling.

The Amateur Athletic Union exercises the power of determining the eligibility of competitors in any athletic meeting, game or entertainment given or sanctioned by its executives. The Union stands guard against the intrusion of professionalism into the game contests it controls. It disqualifies any would-be contestant who has 'received or competed for compensation or reward in any form, for the display, exercise, or for rendering personal service of any kind to any athletic organization, or for becoming or continuing a member of any athletic organization.' The Union also makes ineligible any person who resorts to practices as a contest entrant that bring his *bona fides* in question.

No one can compete who has knowingly entered any contests open to professionals, or has challenged any professional for a prize or token. Another fundamental rule of the Union in the conduct of the sport events it sanctions is that no one can compete unless he is a registered athlete and a member of the organization for which he enters.

The colleges project as the main pivots of athletic activities. In their playing fields the ardor of their student bodies reaches fever pitch and their teamwork produces displays that draw throngs of spectators. College athletics, in other words, are profitable in other respects than turning out physically fit young men. Princeton, for instance, in 1922 had gate receipts for the various athletic events in which her teams participated amounting to \$168,284, to which football contributed \$150,345. She spent \$104,000 on her sports, and the earnings for the total, regardless of source, were about 65 per cent. Princeton is not exceptional among colleges in deriving substantial profits from her pastimes. If other universities have not done so well, many of them have fared even better. Probably the money paid to see athletic spectacles at a number of our educational institutions would support schools of considerable size. The mere volume of college gate receipts is remarkable when it is remembered that fifty years ago revenue from college athletics scarcely existed. Much can be said for self supporting athletics, especially if the funds secured in excess of outlay are applied to the building of fields and tracks and baseball diamonds that bring thousands of additional young men out into the sunshine to develop their bodies. College presidents, alumni and student bodies recognize the increasing importance of the monetary phases of sport exhibitions as associated with the need of greater development of facilities for physical efficiency.

American women are advancing in athletics, especially as tennis and swimmers, but have yet to come to the front internationally. The most outstanding woman player in lawn tennis, Mrs. Franklin I. Mallory, did so in British tournaments, but failed to win the world's championship from the present holder, Mlle. Suzanne Lenglen. A contingent of young American women took part in the first international women's games held in Paris in 1922, winning in hurdles, standing broad jump, running high jump and putting shot. In the result, however, their English competitors scored the most all round points, obtaining 50 as against 31 credited to the American girls.

ATHOL, tn., Massachusetts, U.S. (42° 35' N., 72° 11' W.); large boot, shoe, and furniture factories. Pop. 1920, 9,792.

ATHOR, AYTHOR, HETHER, or HATHOR, daughter of Egyptian deity Ra; approximates with Gr. goddess Aphrodite.

ATHOS (40° 20' N., 24° 10' E.), peninsula, Turkey in Europe; extends into Aegean, connected with mainland by narrow strip of land; canal was made here by Xerxes, c. 470 B.C.; ends in conical peak, Mt. A. (5778 ft.); remarkable for religious establishments; monastic republic since 1060; now has 21 monasteries and about 6000 monks; plundered after fall of Constantinople, 1204; revived under Paleologi; pays tribute to Turkey; MSS., frescoes, mosaics.

ATITLAN, lake, volcano, and tn., Guatemala (14° 42' N., 91° 12' W.); lake in crater 24 m. long, 10 m. broad; alt. 4,700 ft.; depth 1,100 ft.; has no apparent outlet. Volcano near S. end, alt. 11,719 ft. Tn. on S. shore of lake; mineral springs; cotton spinning. Pop. c. 9,000.

ATKINSON, SIR HARRY ALBERT (1831-92), Brit. farmer, financier, and statesman; became prime minister of New Zealand.

ATLANTA, a city of Georgia, the capital of the State and the county seat of Fulton co. It is on several important railroads, including the Georgia, the Louisville and Nashville, the Seaboard Air Line, and the Southern. The city is in the heart of a rich agricultural region which is rapidly developing. It is also the most important commercial center of the Southeast, and is the central distributing point for that part of the country. It has grown rapidly in recent years as a manufacturing city. There were in 1920 over 600 factories with a product of about \$80,000,000 per year, giving employment to over 30,000 operators. The most important industries are the manufacture of cotton goods, fertilizer, machinery, lumber, bricks, wagons, furniture, etc. Atlanta has many important educational institutions over 50 in all. Among these are the Georgia Institute of Technology, Emory University, Oglethorpe University and Lanier University. There are also several colleges for women, among them the Agnes Scott College and Elizabeth Mather College. There are five colleges for negroes. The city is well equipped with public parks and playgrounds. It has a handsome public library and the State Library and State Capital are

among its notable public buildings. There is an auditorium with a seating capacity of 8,000, which is used by the Metropolitan Opera Company for its annual performances. The city has over 20 banks and trust companies. The Federal Reserve Bank of the Sixth District is located here. There are many important newspapers and periodicals.

Atlanta was founded in 1837 as Marthasville. Later it was known as Terminus, and was finally named Atlanta in 1864. Following the battle of Atlanta it was almost entirely destroyed by Sherman's army. The population increased rapidly after the Civil War, 1920, 200,616.

ATLANTIC CITY, a city and seaside resort in Atlantic co. New Jersey. It is on the Sandy Island Railroad and Absecon Beach, and is 60 miles south of Philadelphia. It is connected with that city by steam and electrical railroads. The island stretches along the coast for 10 miles, with an average width of three-fourths of a mile, and is from 4 to 5 miles from the mainland. One of the most important summer resorts in the country has grown up here within comparatively recent years. The city has several miles of bathing beach, a magnificent promenade on the ocean front, many palatial hotels, and all the features of an important city. Atlantic City was probably the first all-year-round resort in the United States. Its invigorating and temperate climate brings many people here, even in the winter. The transient population varies, but is estimated at from 400,000 to 500,000. Pop. 1920, 50,682.

ATLANTIC FLIGHTS. In response to offer of £10,000 prize by *Daily Mail*, numerous aviators attempted an Atlantic crossing in May, 1919. American NC 4 seaplane started first, and reached Azores (1,381 m.) on May 18, in 15 hr, 19 min.; flew Azores to Lisbon, 1,034 m., in 9 hr. 42 min.; and completed final stage, Lisbon to Plymouth, 895 m., in 5 hr. 1 min. Hawker (Brit.) on May 18 attempted flight from St. John's, Newfoundland, to Ireland; accomplished 1,000 m., and alighted in Mid-Atlantic (May 19). On June 14-15 Alcock and A. W. Brown (Brit.), in twin-motor Vickers-Vimy machine, won offered prize and knighthoods for successfully making the flight (1,900 nautical m. in 15 hr. 57 min.). On July 2 of same year Brit. airship R-34 began double journey across the Atlantic (accomplished by July 13).

ATLANTIC OCEAN, ocean separating Old from New World, Europe and Africa lying to E., N. and S. America to

W.; opens northward into Arctic Ocean; spreads out southward into great Southern Ocean, with extreme length of c. 8,500 m. along part enclosed by land; greatest breadth, c. 5,000 m.; narrowest part, between Brazil and African coast, 1,800 m. Area, c. 41,000,000 sq. m. Deepest point, 70 m. N. from Porto Rico, has depth of 4,662 fathoms. Bed crossed by number of telegraphic cables along E.-W. elevation. Relatively saltier than other oceans. Chief commercial highway of world.

ATLANTIS, mythical isl. kingdom, which according to ancient tradition was situated in Atlantic, W. of Pillars of Hercules; rich and extensive; finally engulfed by sea.

ATLANTOSAURUS, genus of gigantic reptiles (extinct order Dinosaurs). Was discovered in Upper Jurassic of Colorado; probably herbivorous and amphibious. Length estimated at 80 ft.

ATLAS (class. myth.). (1) One of the Titans, brother of Prometheus and Epimetheus, led the war against the gods, for which he was condemned by Zeus to bear the heavens upon his shoulders; father of the Hesperides, Pleiades, and Hyades. Another legend makes Atlas a king who refused shelter to Perseus; the latter turned him into a mountain by exposing to his view the head of Medusa. (2) Name given by Mercator to a collection of maps.

ATLAS MOUNTAINS (32° N., 6° W.), irregular series of mountain groups running along N. of Africa from Cape Nun in Morocco to Cape Bon in Tunis, distance of about 1,400 miles. Greatest height, between 14,000 and 15,000 ft.; is near W. end, S. of city of Morocco; from this point eastward elevation steadily falls to little over 7500 ft. in Algeria, c. 4500 ft. in Tunis, and c. 2300 ft. in Tripoli. Hills are covered with pine, oak, poplar, and olive forests in N.W., and S.

ATMOLYSIS, separation of mingled gases of different densities by means of their different rates of diffusion (q.v.) through a porous medium.

ATOMETER, an instrument for the measurement of evaporation from a moist surface, usually consisting of a thin, hollow, earthenware ball inside of which is encased a glass tube, the top of the tube being corked and the sides being marked with graduating numerals. The cavity of the ball and the tube are then filled with water and exposed to the air above the surface whose degree of evaporation is to be measured. The relative rapidity with which the water oozes out through the porous walls of

the ball indicates, by the sinking of the water in the tube, the degree of evaporation.

ATMOSPHERE, gaseous envelope surrounding a heavenly body, in the earth possibly to height of 200 miles; air pressure at sea-level, or at 760 mm. of mercurial barometer, 14.7 lb. per sq. inch. Air is a mixture, not a compound, averaging 77.12% nitrogen, 20.66% oxygen, c. 1.4% aqueous vapor, c. 0.79% argon, 0.03% carbon dioxide, and traces of hydrogen, krypton, neon, xenon, and helium, besides dust.

ATOLL, coral island enclosing a central lagoon, very common in the Pacific Ocean. The shape is something like that of a horseshoe, the opening to the lagoon being on the leeward side.

ATOM (Gr., 'cannot be cut,' 'indivisible'), signifies the smallest possible particle which is believed to enter into the constitution of matter. This forms the basis of Dalton's atomic theory of matter, as opposed to the older hypothesis that matter is continuous and infinitely divisible. The real nature of ultimate atoms has not been determined. Chemical theory and practice are still based on the atomic hypothesis. The molecule is defined to be the smallest particle of matter theoretically obtainable by mechanical subdivision. It is considered to be made up of two or more atoms separable only by chemical means. When two substances chemically react on one another, the action is looked upon as taking place between the molecules of the substances, resulting in an exchange of atoms with the formation of molecules with new atomic compositions—(i.e.) two new substances are formed.

Atomic Weight.—Although the atom is a theoretical conception, definite weights have been assigned to the atoms of elements, the weight of the hydrogen atom being taken as the unit. The atomic weight of an element is decided from consideration of the laws of chemical combination, based on experimental results, together with the hypothesis of Avogadro *re* equal volumes of gases containing the same number of molecules.

ATONEMENT, involves the idea that man is somehow alienated from God and needs to be reconciled. Jewish 'Day of Atonement' one of most important annual observances. In Christian theol. doctrine of a. has taken various forms. Some said Christ paid 'ransom' to Satan; according to others 'ransom' was paid to God, or sacrifice was within Divine nature itself; Christ being infinite

was able to satisfy for human sin, which, on account of the Being sinned against, was also infinite.

ATRATO, riv. Colombia, S. America, flowing into the Gulf of Darien (8° 9' N., 76° 58' W.); length, 410 m.; area of basin, 11,400 sq. m.

ATREUS (Gk. myth.), king of Mycenae, whose descendants were known as *Atrides*; s. of Pelops and Hippodamia, and f. of Agamemnon and Menelaus; slew children of bro. Thyestes, to whom he served them up as food, and drew down curse on his race; slain by *Aegisthus*, s. of Thyestes.

ATRIUM, a name given by the Romans to the great central hall in their dwellings, which was the reception and living-room, and contained the household gods, etc. A space in the centre of the roof was open to the sky, and in the floor beneath was a marble basin into which the rain water drained.

ATROPHY, wasting of a part or the whole of the body, essentially due to impairment of nutrition; may be practically physiological, (e.g.) thymus gland after birth, and uterus after parturition; more usually due to disease, malnutrition, or obstruction of blood supply.

ATROPINE, alkaloid which occurs along with hyoscyamine in *Atropa belladonna* (deadly nightshade) and other Solanaceous plants, chiefly *Scopolia noliica*; powerful poison; dilates pupil of eye; quickens heart's action, etc.

ATROPOS (class. myth.), one of the three Fates—*Clotho*, the spinning fate; *Lachesis*, who drew out the thread and thus assigned to man his fate; and *Atropos*, who cut the thread with her 'abhorred shears.'

ATTACHMENT (legal term); any person who has obtained a judgment or order for the recovery or payment of money may apply to a Court or a judge for an order that all debts owing to or accruing to the judgment debtor shall be attached to answer the judgment or order. If the Court makes such an order, then the person who owes the judgment debtor any sum is called the 'garnishee.' The latter is summoned to appear before the Court to show cause why he should not pay the money owing to the judgment creditor for the purpose of satisfying the judgment debt. The garnishee may either admit or dispute the debt, but even if he admits it he should not pay the money to the judgment creditor until he has received the order of the Court.

ATTAINER, BILL OF, a means of

reaching offenders whom the ordinary process of law, or an impeachment, would probably fail to touch, for want of legal proof or some other technicality. A bill is brought in and has to pass through both Houses of Parliament, declaring that the accused has been guilty of treason in certain acts. The accused is then allowed to defend himself before both Houses. If the bill passes, and receives the sovereign's assent, the ordinary consequences of a conviction for treason follow. The last instance of the passing of a bill of a. in England was that against Lord Edward Fitzgerald, a principal in the Irish rebellion of 1798.

ATTALEA, genus of S. Amer. palms. *Bahia plussava* is obtained from *A. funifera*, the hard bony fruits being known as 'coquilla' nuts, used in turnery. *A. cohune* yields the cohune nuts of commerce; species of Brazil gives babassu nuts (both contain 70 per cent. edible fat).

ATTAR, or **OTTO OF ROSES**, perfume of essential oil of roses, prepared in Bulgaria, Persia, and India.

ATTEBURY, FRANCIS (1682-1782). Eng. politician, writer, and bp. of Rochester; b. at Milton, Bucks; royal chaplain, 1691; supported High Church party in controversies of 1700; dean of Carlisle, 1704; prominent in trial of Sacheverell, whose defence is attributed to him, 1710; dean of Christ Church, Oxford, 1711; administered affairs badly; bp. of Rochester, 1713. After accession of George I. plotted in favor of Pretender; he was arrested, imprisoned, stripped of dignities, and finally exiled; d. in Paris, and was buried, privately, in Westminster Abbey.

ATTEBURY, GROSVENOR (1869), an American architect, b. in Detroit, Mich. After graduating from Yale University, in 1891, he studied at the School of Architecture, Columbia University, then took a two years' course at the Ecole des Beaux Arts, in Paris. His reputation rests on his specialty of town planning and industrial housing, on which he is one of the leading authorities. He was architect for Forest Hills Gardens, a model community established by the Russel Sage Foundation on Long Island, N.Y. Another one of his outstanding achievements is the industrial community at Indian Hill, near Worcester, Mass.

ATTEBURY, WILLIAM WALLACE (1866), an American railroad official, b. in New Albany, Ind. After his graduation from Yale University, in 1886, he entered the Altoona railroad shops of

the Pennsylvania Railroad, as an apprentice, becoming general manager of the road in 1903. Since 1912 he has been first vice president in charge of operations. During 1917-19 he served in France, with the rank of brigadier-general, and superintended the building of the military railroads for the transportation of the American forces and their supplies to and from the front. In 1919 he returned to his former position as superintendent of operations of the Pennsylvania R.R. During 1922 he was very prominent in the negotiations between the railroad operators and their striking shopmen, displaying a liberal tendency which did much toward terminating the strike trouble.

ATTIC, something pertaining to Attica, in Greece; hence, 'A. muse,' Xenophon, famed for his simple and elegant style; 'A. salt,' the quality of delicate wit; 'A. taste,' used by Milton in reference to the elegance of Gk. poetry; 'Atticism,' term used to describe an elegant composition in any language, but more particularly in ancient Gk. The word is also used by moderns to describe the top story of a dwelling.

ATTICA (38° 15' N., 28° 25' E.), eastern division, ancient Greece, in form of triangle, one side of which is separated from Boeotia by mountains, while other two are washed by Aegean Sea; chief rivers, Ilissus, Cephissus; capital, Athens (q.v.); chief mountains, Oithaeron and Parnes ranges. Surface consists of series of plains separated from each other by mountain ridges; plains are the Athenian, which stretches from sea to Parnes range and has Hymettus in E., famed for blue marble, and in N.E., Pentelcus, which has white marble quarries; and the plains of Eleusis in S.W., Megara in W., and Marathon in N.E. A. produces olives, grapes, figs. Laurium, famed in ancient times for silver mines, now produces lead, manganese. Climate is almost perfect. A. formed monarchy with Boeotia till 1899, since when it has been separate department, including Megaris, Egina, Salamis, Makronisi. Area, 2474 sq. miles. Pop. 581,829.

ATTILA (c. 406-53), king of the Huns, known as the 'Scourge of God'; s. of Mundzuk; reigned jointly with his bro. Bleda after succeeding their uncle Rhuas (434); put Bleda to death (444), and afterwards reigned alone. His original kingdom (modern Hungary and Transylvania) he greatly extended; he overran Greece, Thrace, and Macedon, and made himself virtually supreme in Europe; invaded Gaul (451), but was defeated with great slaughter near site

of Châlons-sur-Marne by Romans under Aëtius, and the Visigoths under Theodoric. In the following year he devastated northern Italy; threatened Rome, which was only saved from destruction by the appeal of Pope Leo I., and died on the night of his marriage with the Princess Hilda of Burgundy.

ATTLEBORO, a city in Bristol co., Mass., 30 miles southwest of Boston. It is an important industrial center, over 150 industrial plants being located here, employing normally about 7,000 workers. In 1914 \$15,000,000 were invested in local manufacturing. Among the commodities produced are boots and shoes, electro plating, cotton and woolen goods and jewelry. Pop. 1920, 19,731.

ATTORNEY-AT-LAW, Amer. name for solicitor; obsolete in England since 1873. Attorney-in-fact (one having 'power of a.') is a proxy, or agent, deputed to transact the business affairs of another absent person.

ATTORNEY GENERAL, a member of the Cabinet of the United States, who presides over the Department of Justice. His function is to furnish legal advice needed by the Federal authorities and carry on all litigation which arises from a breach of Federal legislation. He also recommends persons to fill the places of the judges of the United States Circuit and District courts. Each State has an officer of this title whose functions are practically the same as those of the Federal official. In England the Attorney-General is the highest legal functionary, permanently retained at a salary to take the part of the Court in any suit affecting the public interests.

AUBREY, JOHN (1826-97), Eng. antiquary; s. of a Wiltshire country gentleman; dissipated his estates; supplied Anthony à Wood with much quaint information for the latter's *Athenae Oxonienses*. His only completed work was the *Miscellanies*, pub. 1896, dealing with the subject of ghosts and dreams.

AUBURN—(1) (44° 7' N., 70° 14' W.), town, Maine, U.S.A.; manufactures boots. Pop. 1920, 16,985.

AUBURN, a city, the county seat of Cayuga co., New York, on Owasco Lake, and on the New York Central and Hudson River and Lehigh Valley railroads. It is about 175 miles west of Albany. It is an important industrial center. It has manufactures of reapers, mowers, binders and other agricultural machinery. There are also factories making shoes, carpets and rugs, woolen goods, Diesel oil engines, buttons, drop

forgings, etc. Excellent water power is supplied from the lake. Auburn is the seat of the Auburn Theological Seminary and also contains a State prison, a prison for women, and the State Armory. There are about 25 churches, high schools, banks, hospitals, libraries and several newspapers. Pop. 1920, 36,192; 1923, 36,742.

AUBURN THEOLOGICAL SEMINARY, an institution for the training of clergymen for the Presbyterian denomination, at Auburn, N.Y. It was established in 1920. It has about 50 students and about 15 members of the faculty.

AUBUSSON (45° 57' N., 2° 10' E.), town on Cœuse, France; notable for artistic carpet-weaving. Pop. 7,000.

AUBUSSON, PIERRE D' (1423-1503), Fr. soldier and cardinal; grand master of Order of St. John of Jerusalem; forcibly extirpated Judaism in Rhodes.

AUCASSIN ET NICOLETTE, famous old Fr. romance in prose and verse by unknown author; date early XIII. cent.; pub. in Eng. by A. Lang, Laurence Housman, and Bourdillon.

AUCKLAND (36° 52' S., 174° 46' E.).—(1) Seaport, N. Island, New Zealand; splendid harbor; fine public buildings, parks; shipbuilding, sugar works. Pop. 1921, 40,500; with suburbs, 157,757. (2) Provincial district, N.Z. Area, 25,746 sq. miles. Pop. (excluding Maories) 1921, 369,618.

AUCKLAND ISLANDS (50° 25' S., 166° 7' E.), volcanic islands, Pacific; uninhabited.

AUCTION is the method of disposing of property or goods to the highest bidder. The projected sale having been duly advertised, the *Auctioneer*, on the day appointed, 'puts up' the various lots, or articles and they are duly 'knocked down' to the person offering the highest price. Frequently the vender places a reserve price upon his property or goods, and if this amount is not reached by those bidding, the property is withdrawn. In what is termed a *Dutch auction*, goods are offered at a particular figure, and subsequently reduced until a buyer is found. The Scot. term for auction is 'roup,' and the conditions of the sale are known as 'articles of roup.'

AUCUBA JAPONICA, Jap. laurel with red berries; male and female flowers on separate plants.

AUDÉ. (1) River, France, crosses Aude, enters Mediterranean (43° 13' N., 3° 15' E.). Length, 139 m. (2) Maritime dep., France; maize, vines, fruit; slate marble, copper, lead, tin, iron ore;

Narbonne honey is famous. Cap. Carcassonne, 390 m. S. of Paris. Area, 2,448 sq. m.; Pop. 300,000.

AUDION, a detector, or amplifier, magnifying sound to the ear as a microscope magnifies for the eye, especially in reference to the telephone. It was invented in 1907 by an American inventor, Lee De Forest, and within five years was adopted by the telephone companies, making transcontinental service possible. It consists of a small, vacuum tube in which is an electric light filament, which may be heated by an electric current, the filament being an arrangement of fine wires, usually of nickel, shaped like a gridiron, and a plate, also of nickel. See **RADIO TELEPHONE**.

AUDIPHONE, an instrument to assist partially deaf persons in hearing. It is formed on the principle of a musical instrument, being a convex sheet of hard rubber, about a foot in diameter, strings being fastened across it from the edges, across the concave face, like those of a banjo, the concave side being outward when in use. By pressing the handle against the teeth the sound is conveyed through the bones of the head to the partially destroyed auditory nerves. The instrument may be adjusted to varying tones by tightening or loosening the strings.

AUDIT, an examination of the accounts of any concern to see if they truly represent its position.—*Auditor*, a person who examines the accounts of a business so as to ascertain its exact financial position. The law now requires that the accounts of local governing bodies be audited, as must also accounts of all bodies entrusted with public funds. The mere fact that an a. certifies accounts to be correct, and that books have been properly kept, is no guarantee.

AUDITORY NERVE, the special nerve for the sense of hearing. See **E.A.R.**

AUDRAN, GÉRARD (1640–1703), Fr. engraver; celebrated for his engravings of Le Brun's 'Battles of Alexander,' 'Stoning of Stephan,' and 'Constantine's Battle with Maxentius.' He stands in the front rank of Fr. engravers, and was a member of a family which for several generations was distinguished in the same line.

AUDUBON, JOHN JAMES (1780–1851), an American naturalist of French descent, born in New Orleans. He received his education in France and studied painting under the great artist, David. Returning to the United States he settled in Pennsylvania in 1798. As a result of his passion for ornithology he

started in 1810, with his wife and child, on an expedition for the purpose of studying birds. For many years he roamed the forest in every direction, making drawings of the birds wherever he went. He exhibited these drawings in Liverpool and other European cities, in 1826, and afterwards published them in a work of 435 colored plates of birds, with the title *Birds of America*. This remains the finest work of the kind ever done. After his return to the United States, he compiled, together with Dr. Bachman, an illustrated work entitled *Quadrupeds of America*, (1843–50). He died in New York City in 1851.

AUDUBON BIRD RESERVATION, named in honor of Audubon, the naturalist, reservations set apart for the protection and preservation of birds, under the direction of the National Association of Audubon Societies. There are such reservations in Louisiana, Maine, Massachusetts, Michigan, Florida, Virginia, South Carolina and North Carolina. In 1923 there were 44 such reservations.

AUDUBON SOCIETIES, NATIONAL ASSOCIATION OF, a society organized for the preservation of birds and the study of bird life. It was incorporated in 1905. Its headquarters are in New York City. The Association has general care of the Audubon Bird Reservations. It publishes a magazine and other literature. Membership about 15,000.

AUE (50° 35' N., 12° 44' E.), town, Saxony; machinery. Pop. 18,000.

AUER, LEOPOLD (1845), Hungarian-Russian violinist, b. in Veszprim, Hungary. After studying at the conservatories of Budapest and Vienna and Hanover, he went to Russia, where he became naturalized and was professor in the Imperial Conservatory of Petrograd. Later he was made soloist on the violin for the Czar and given the rank of a noble. Since 1918 he has lived as a refugee in New York. Auer was widely famous as a violinist in his younger days, but it is as a teacher that he is best known, among his pupils being Mischa Elman and Zimballist. He has also composed some music for the violin.

AUERBACH, BERTHOLD (1812–82); Ger. novelist; achieved success (1837) with novel founded on life of Spinoza; later became widely known for stories dealing with peasantry of Black Forest.

AUERSTADT, vi., Prussia (51° 5' N., 11° 34' E.); Prussians severely defeated by French (1806). Pop. 600.

AUGEAN STABLES (classical myth.), stables of Augeas, king of Elis, Greece; contained 3000 oxen and remained un-

cleaned for thirty years; one of 12 labors of Hercules to cleanse them in a day was performed by turning rivers Alpheus and Peneus through them.

AUGEREAU, PIERRE FRANÇOIS CHARLES, DUKE OF CASTIGLIONE (1757-1816), Fr. general; b. Paris; served in Russian, Prussian, Neapolitan, and Fr. armies; distinguished himself under Bonaparte; became marshal (1804). He was deprived by Louis XVIII. of military title and pension.

AUGIER, GUILLAUME VICTOR EMILE (1820-89), Fr. dramatist, successful writer of comedies distinguished for their wholesome didacticism—(e.g.) *Gabrielle*, *La Cigue*, etc.

AUGITE (CaMgSiO₄, with aluminum and iron silicates), a mineral of the pyroxene order similar to hornblende and composed of such igneous rocks as basalt, greenstone, and porphyry; found in rhombic crystals; composed of silica and magnesia, and generally of a dark green color; varieties: diopside, sahlite, mala-colite, and coccolite.

AUGMENTATION as technical term: (1) (XVI. cent.) addition to revenues of crown from dissolved monasteries; this led to A. Office and Court of A. (established 1536 to settle disputes as to title). (2) (Heraldry) Additional charge to coat of arms to assume which crown grants license. (3) (Music) Extension of original theme in composition. (4) Process of A. in Scot. Court of Teinds is action brought by minister to obtain increase of stipend.

AUGSBURG, cathedral tn.; Bavaria (48° 22' N., 10° 54' E.); cotton spinning and weaving mills; woolen and paper factories; breweries; dye works. Founded 15 B.C.; free imperial city, 1268; great emporium of trade between N. Europe, Venice, and Levant during 15th and 16th cents. Pop. 155,000.

Confession of Augsburg, Prot. manifesto drawn up by Luther. Melancthon, and others, 1530 and presented to Chas. V. at Augsburg; met by Papal *confutatio*, to which Melancthon replied; its acceptance basis of Schmalkaldic league; one of the sources of Eng. Thirty-nine Articles.

AUGSBURG INTERIM, THE. To re-establish unity of Church, Charles V. had the *Interim* drawn up by theologians of both sides (1547). It allowed clerical marriages and certain doctrinal changes; retained seven sacraments and worship of Virgin; reaffirmed transubstantiation. Accepted by Diet (May 19, 1548); rejected by Romanists and Protestants.

AUGURS, members of a college of

Roman soothsayers. The order is said to have been founded by Romulus, and lasted until the IV. cent. A.D. In early times it consisted of three members, but this number was gradually increased, until in the time of Julius Cæsar there were sixteen a's, and this number continued under the later emperors. The duty of the a. was the interpretation of signs and portents—thunder and lightning, the movements of comets and shooting stars, the flight of birds, etc. His observations were made within a rectangular space (*templum*), after prayer, and in the presence of a magistrate. The a's insignia consisted of a peculiarly knotted staff, and a toga bordered with purple and bearing scarlet stripes.

AUGUST, month of, named after Roman emperor Augustus; previously called sixth month (*Sextilis*); Roman year commencing (as did English till 1752) in March; 31st day added by Augustus.

AUGUSTA, a city of Ga.; and capital of Richmond County, fourth in size in the state, 230 miles up the Savannah River and 170 miles east of Atlanta. Seven railroads pass through the city, among them being the Central R. R. of Georgia, the Charleston & West Carolina and the Atlantic Coast Line railroads. It is also a river shipping port being reached by vessels of considerable size. A dam seven miles above the city supplies water power for its industries, being one of the big cotton manufacturing centers of the South. There are also cotton seed oil mills, lumber yards, brick yards, etc., employing normally 5,000 workers. The Georgia Medical College, a branch of the State University, is located here. It has three daily papers. Pop. 1920, 52,548, and including suburbs across the river, not properly a part of the city, about 75,000.

AUGUSTA, a city, of Maine, the county seat of Kennebec co., and the capital of the State of Maine. It is situated on the Kennebec River and on the Maine Central Railroad. It is 63 miles north east of Portland. The city includes both banks on the river and is built on a series of terraces, the most important part being on the west bank. The State house, a handsome building, contains the State Library and a fine collection of portraits of American statesmen. There are several parks, in the principal one of which is a soldiers' and sailors' monument. There are many important public institutions in the city. These include the State Asylum for the Insane and the United States Arsenal. The National soldiers' home is four miles distant. The city has important

manufactures and abundant water power. The chief industries are the manufacture of cotton goods, paper, wood pulp, and lumber. There is the Lithgow Public Library and other public buildings. Augusta is an important publishing center. Several periodicals of large circulation are issued weekly. The city was first settled by traders from Massachusetts in 1774. It became the capital of the State in 1831, and in 1849 received a city charter. Pop. 1920, 14,114.

AUGUSTA (37° 13' N., 15° 13' E.), port, Sicily. Pop. 15,000. Near A. Admiral De Ruyter, commanding the combined Span. and Dutch fleets, defeated the French under Duquesne.

AUGUSTA, MARIE LOUISE KATHARINA (1811-90), Empress of Germany, wife of William I., and daughter of the Grand-duke of Saxe-Weimar is chiefly remembered for her benevolence

AUGUSTA VICTORIA (1858-1921), ex-German Empress and Queen of Prussia, daughter of Duke of Schleswig-Holstein, married Prince William of Prussia, afterwards Emperor William II., in 1881; interested herself in hospital work and generally in the spheres delimited for Ger. women by her husband — *Kirche, Kinder, Küche*; accompanied him into exile in Holland (1918). She died April 11th, 1921.

AUGUSTINE, ST. (d. 612-14), Apostle of England sent by Pope Gregory I.; landed at Thanet, 597; converted Æthelbert of Kent; made abp. of Canterbury, 601.

AUGUSTINE, ST., OF HIPPO (354-430), one of the greatest Christian saints; son of a Christian mother, Monica, but himself a pagan till 387. His conversion to Christianity was the result of a gradual process. Always searching for truth, he could not be contented with Manichæism. He passed not only intellectual and spiritual but moral conflicts, and had great struggles before he could give up a sensual life. His experiences influenced his passionate temperament, and have left their mark through his writings on subsequent Christian theol. His works are very voluminous, but some stand out—his *Confessions*, wherein he recounts his own experience; the *De Civitate Dei*, in which he repels the attacks on Christianity made by paganism; his *De Trinitate* and commentary on St. John. He was the great opponent of Pelagianism. His work has probably had a larger influence on the Church than that of any other single saint or theologian. *Regula B.A.*, a rule of life drawn up by Augustine, formed the basis of the constitutions of

many mediæval religious orders.

AUGUSTINIAN or **AUSTIN FRIARS**, strict order of mendicant friars; till 1250 in isolated congregations, then united into Order; once very numerous on Continent, few in England.

AUGUSTOVO (53° 50' N., 22° 58' E.), town, Poland. Pop. 15,000.

AUGUSTULUS, ROMULUS, last Rom. emperor of the W.; diminutive A. sign of contempt; deposed 476 by Odoacer.

AUGUSTUS, title, meaning 'the revered,' first bestowed by Roman senate (27 B.C.) on Gaius Julius Cæsar Octavianus, 1st Roman emperor, and afterwards adopted by all succeeding Roman emperors, whence the title *Augustan History*, given to a chronological series of imperial biographies, from Hadrian to Carinus, the work of 6 authors (not collaborators), written professedly during reigns of Diocletian and Constantine. Original documents, both genuine and spurious, are cited in the work. In the age of Theodosius the lives were seriously interpolated.

AUGUSTUS CÆSAR (63 B.C.-14 A.D.), generally reputed 1st Roman emperor (though Cæsar, towards the end of his life, assumed and wielded imperial power). Gaius Julius Cæsar Octavianus was s. of Gaius Octavius and Atia, niece of Julius Cæsar; his f. died whilst the boy was still young; adopted by his great-uncle (Cæsar) as his son, and subsequently declared his heir; sent to Apollonia by him to be educated under Apollodorus, where he was when news reached him of Cæsar's murder (44 B.C.); went to Rome and professed republican principles; took up arms against Antony, whom he defeated at Mutina; subsequently threw in his lot with Antony and Lepidus, and formed the triumvirate (43 B.C.). In conjunction with Antony, A. defeated Brutus and Cassius at Philippi (42 B.C.). Differences subsequently arising between the triumvirs, the Empire was divided, A. taking the W., Antony the E., and Lepidus receiving Africa. A. destroyed the power of Sextus Pompeius (36 B.C.), deposed Lepidus, and making war on Antony, who had repudiated his wife, Octavia (sister of Augustus), defeated him at Actium (31 B.C.). He now became supreme ruler of the entire Roman Empire, but restored the form of the republic, and achieved marked popularity by his reform of abuses, and in particular by his reform of the administration of the provinces. His later years were marked by brilliant victories in Asia, Spain, Gaul, and other places, but his army suffered a crushing defeat

under Varus, in Germany (9 A.D.). Besides being one of the greatest statesmen the world has seen, A. did much to improve and beautify Rome. It was said that he found a city built of brick and left a city built of marble. He was deified after death. His period is known as the *Augustan Age*, and amongst the great authors who adorned it were Vergil, Horace, Ovid, Tibullus, Livy, and others.

AUGUSTUS II, KING OF POLAND (1670-1733); became elector of Saxony (as Frederick Augustus I.), 1694; secured election of Polish throne (1697); deposed after defeat by Charles XII. of Sweden (1702); recovered Poland after *Poltava* (1709). His aim was to make Poland hereditary monarchy, and weaken power of Saxon nobles.

AUGUSTUS III. (1696-1763), king of Poland; known also as Elector Frederick Augustus II. of Saxony.

AUKS (*A cidae*), family of diving sea-fowl with short wings; the *great a.* or *garefowl* recently extinct; a's eggs about same size as a swan's, yellowish white with black markings, are highly prized by collectors, and have realized as much as \$1,500 each.

AULIC COUNCIL, the supreme council of the Holy Roman Empire, established by Emperor Maximilian (1497-1501). Consisting of eighteen members, it was the supreme judicial and administrative body. The term, after the dissolution of the empire, was applied to the Austrian council of state.

AULIS, seap., anc. Boetia (38° 26' N., 23° 35' E.), here Gr. fleet assembled for Trojan War.

AUMALE. (1) Tn., Seine-Inférieure, France (49° 46' N., 1° 44' E.); cloth, leather, and steel; formerly Albemarle, original seat of Eng. family of that name. Pop. 2,400. (2) Military post, Algeria, anc. *Auzia* (36° 9' N., 3° 41' E.); many Roman remains. Pop. 6,400.

AURA, peculiar feeling, taking different forms, such as shivering or nausea, which persons subject to epileptic fits experience immediately before an attack; electrical discharge causing air current.

AURANGABAD, AURUNGABAD (19° 54' N., 75° 15' E.).—(1) town, Hyderabad, India. Pop. 36,800. (2) district area, 6172 sq. miles. Pop. 721,400. (3) division comprising four districts; A., Parbhani, Nander, and Bhir.

AURANGZEB, AURUNGZEBE (1618-1707), great Mogul emperor of Hindustan; seized throne by craft.

AURAY (47° 40' N., 2° 59' W.), town,

France, leading center of sardine and other fisheries; scene of famous battle (1364); church of St. Anne is place of pilgrimage. Pop. 5200.

AURELIAN, L. DOMITIUS AURELIANUS (c. 214-275), Rom. emperor; general of Emperor Claudius II.; succ. him as emperor, 270; ended Gothic war, resigning Dacia to Goths; secured Rhine and Danube frontiers; destroyed Zenobia's monarchy; he restored unity of empire, and began the rebuilding and enlargement of the walls of Rome, a task completed after his death. *Aurelian Way*, *Via Aurelia*, old high road, Italy; starting from Rome, it ran northwards along the coast through modern Palo and Orbetello.

AURIGA ('Charlioteer'), brilliant pentagonal constellation of N. hemisphere, between Taurus and Perseus; chief stars never set in Brit. Islands.

AUROCHS (*Bos taurus primigenius*), recently extinct European wild ox (*Urus* of Cæsar), from which many modern cattle breeds are descended. The bison preserved in Lithuanian and Caucasian forests is closely allied.

AURORA (classical myth.), Roman name of the dawn-goddess (Greek, *Eos*), dau. of Hyperion and Thea; usually spoken of by the ancient poets as 'rosy-fingered.'

AURORA, a city of Illinois, in Kane co. It is on the Chicago, Burlington and Quincy, the Chicago, Northwestern, and the Chicago, Milwaukee and St. Louis railroads, and in the Fox river valley. It is an important manufacturing city and has plants for the making of agricultural implements, automobile accessories, aeroplane engines, crucibles, farm wagons, steel products, etc. There is a public library, several hospitals and parks and playgrounds. It is the seat of Aurora College and several private institutions. Pop. 1920. 44,972; 1923. 45,000.

AURORA BOREALIS AND AUSTRALIS, POLAR LIGHTS, meteorological phenomenon occurring in high latitudes, chiefly observed in the direction of the magnetic meridian in the northern hemisphere (*Aurora Borealis*), as there is little inhabited land in high latitudes in the southern hemisphere, where it is termed *Aurora Australis*. It takes the form of arcs, bands, rays, wavy curtains, patches, or a 'corona' varying in color from silvery white to yellow, green, violet, or red, which move about

coruscating or resembling illuminated clouds. Curves connecting points of equal annual frequency are termed *isochasms*, the maximum being an oval belt round the N. coast of Siberia, N. America, Labrador, and through the Faroe Islands and N. Norway. Both annual variations in the occurrence have been observed with a maximum in midwinter and a minimum in midsummer, and diurnal variations with a maximum in the evening. Numerous explanations of the phenomenon have been brought forward, most investigators agreeing that it represents some form of electrical discharge. There is an intimate relation between aurora and magnetic disturbances, another remarkable connection existing between the frequency of auroral displays and sunspots. A swishing sound is alleged to accompany a. when low above the ground. The phenomenon can be artificially produced by discharging electricity of high potential from a number of metallic points.

AUSCULTATION, listening to the sounds perceptible in the human body, in order to judge the condition of certain organs, especially the heart and lungs. The *stethoscope*, invented by the French physician Laënnec (1781-1826), is the instrument used for this purpose.

AUSGLEICH (Ger. adjustment'), especially applied to treaties arranging dual government of Austria and Hungary.

AUSONIUS, DECIMUS MAGNUS (310-395), Rom. poet, rhetorician; his extant works include *Gratiarum Actio*, an address to Gratian; *Periochæ*, being summaries of the *Iliad* and *Odyssey*; trans. from the *Greek Anthology*, and other works of a scholarly kind.

AUSPICES, omens which Romans saw in flights of birds.

AUSTEN, JANE (1775-1817); Eng. novelist; dau. of Rev. George A.; b. at Steventon Rectory (Hants). Her life was uneventful, and was passed entirely in the county of her birth, at Bath, Southampton, and Winchester, where she died. Of her six novels, *Sense and Sensibility* (1811), *Pride and Prejudice* (1814), and *Emma* (1816) were all published anonymously, while *Northanger Abbey* and *Persuasion* were published in the year following her death.

AUSTERLITZ, town; Austria near which, on Dec. 2, 1805, Napoleon, with a much smaller force, defeated the Austrians and Russians; casualties of allies about 30,000 while Fr. losses only about 7000. Town has palace, church. Pop. 3000 to 4000.

AUSTIN, county seat of Mower County Minn., on the Red Cedar River and on the Chicago & Great Western R.R., 100 miles south of St. Paul. It is the shipping point of much live stock and grains and also is quite active as a manufacturing center, its industries including a meat packing plant, flour mills, a cement works, cre merie, a rolling mill and railroad shops. The Southern Normal School is located here. Pop 1920, 10,118.

AUSTIN, a city of Texas, the capital of the State and the county seat of Travis co. It is on the Colorado River, on the International Great Northern the Missouri, Kansas and Texas, and other railroads. From the river it derives large power which is employed in manufacturing. Its industries include the manufacture of oil, lumber, iron, flour, leather, etc. The city contains many handsome public buildings, including the State Capitol, the main buildings of the State University, the State Confederate Home, the State Asylum, etc. The State Capitol is a handsome building which is situated in a square of 10 acres in which are also the Supreme Court and the Treasury building. The Colorado River is spanned by two large bridges and the construction of a dam gives to the city a beautiful stretch of water known as Lake McDonald. Austin was originally known as Waterloo. It was re-named in 1834 after Stephen S. Austin, the famous pioneer of Texas. It was the capital of the Republic in 1839 and in 1872 was made the capital of the State. Pop. 1920, 34,876; 1924, 36,683.

AUSTIN, ALFRED (1835-1913); Eng. Poet-Laureate (1896); b. Headingley (Yorks); ed. for the Bar, but devoted himself to journalism, and became leader-writer for the *Standard*; made his first appearance as a poet with *The Season: a Satire* (1861), and since that date has issued many volumes of drama, narrative, and lyric verse.

AUSTIN, CYRUS BROOKS (1851), an American educator, b. in Clinton County, Ohio. Graduating from the Ohio Wesleyan University, in 1879, he continued teaching there, later becoming professor of mathematics and astronomy. Since 1920 he has been vice president and professor of mathematics.

AUSTIN, MARY HUNTER (1863), an American author, . in Carlinville, Ill. She graduated from Blackburn University, in 1888. For seventeen years she devoted herself to a close study of Indian life in the Mohave Desert, thus obtaining the material for a great many of her books. These include *The Land of Little Rain* (1903); *The Flock* (1906);

Christ in Italy (1911); *The Man Who Didn't Believe in Christmas* (a play, produced in New York City, 1916), and a chapter on *Aboriginal Literature* in the *Cambridge History of American Literature* (1919).

AUSTIN, OSCAR PHELPS, an Am. statistician, b. in Newark, Ill. At the age of twelve he came to Nebraska, where he acquired a public school education. For some years he was engaged in newspaper work in Chicago and Cincinnati, Ohio, later going to Washington, D.C., as correspondent for Chicago papers. In 1898 he was appointed chief of the Bureau of Statistics, in the Department of Commerce and Labor, from which position he resigned in 1914 to become statistician for the National City Bank, of New York. He is the author of a series of boys' books, including *Uncle Sam's Secrets*, *Uncle Sam's Soldiers*, and *Uncle Sam's Children*. Another series for adults describes commercial conditions in China, Japan, the Philippines, bearing such titles as *Commercial Japan*, etc.

AUSTRALASIA (Southern Asia). This term is sometimes used as the equivalent of Oceania, and as such indicates Australia with the neighboring islands—Tasmania, New Zealand, New Guinea, the New Hebrides, New Caledonia—the Malay Archipelago, the Philippines, and the other islands of the Pacific. Geographically it is most frequently used to denote Australia with Tasmania, New Guinea, New Zealand, New Caledonia, and the Solomon, Bismarck, and New Hebrides groups. It is also popularly used to signify the Australian possessions. See MAP WORLD.

AUSTRALIA, continent, southern hemisphere (10° 41'–39° 8' S., 112° 57'–153° 39' E.), bounded N. by Arafura and Timor Seas, E. by S. Pacific, S.W. and N.W. by Indian Ocean; separated from Tasmania by Bass Strait. Coastline little indented: mountains most marked in E., where they extend from Cape York to Tasmania in Great Dividing Range, known in different places as New England and Liverpool Ranges, Blue Mts., Australian Alps, and Grampians; highest peak, Mt. Townshend (7,350 ft.), Australian Alps; across centre of continent are Coast, Macdonnell, and Flinders Ranges; in S.W. is Darling Range. There are no active volcanoes; there are tablelands on either side of Great Dividing Range, that on W. sloping to great central Upland Plains, which pass into Great Sandy and Victoria Deserts farther W. Lakes are Eyre, Torrens, Gairdner, Amadeus, Frome—all salt lakes—in S. Australia and

Northern Territory; Austin Barlea, Cow-cowling, in Western Australia. Principal rivers are Victoria and Roper, in Northern Territory; Flinders, Burdekin, Fitzroy, and Brisbane in Queensland; Hunter in New South Wales; Murchison and Swan, in Western Australia; S.E. drained by Murray-Darling system, which drains Great Lowland Plain, entering sea on S. coast.

The climate generally is warm and dry; mean ann. temp. ranges from 85° in N.W. to 55° in S. of Victoria. Rain in some parts torrential; often there are long droughts, disastrous to stock. For climate and production, Dividing Range is important, as it lies directly in path of S.E. trades and therefore drains moisture from rainbearing clouds carried against land, with result that E. coast strip receives too much rain, central and W. districts too little. Rainfall is heaviest in N.

Australia has unique fauna, having great number of marsupial animals, among which kangaroos, wombats, and opossums may be mentioned as typical Australian mammals. Platypus and spiny ant-eater are peculiar. Many parrots occur, and emus, lyre-birds, and black swans are found. Temperate flora adapted to resist drought.

Geology.—Chiefly composed of Pre-Cambrian rocks; granite forms basis of tableland; volcanic rocks occur in eastern mountainous districts.

Resources.—Vegetable productions may be divided into (1) tropical and subtropical forest and crops, in N. and part of E. Queensland coast; (2) forests and crops of temperate zone, in E. and S. coasts, except along Bight. (3) mountain forests of temperate zone, along Dividing Range. (4) evergreen bushes, in S.W. and both sides of Spencer Gulf; (5) pasture and scrub, on rest of country except deserts. There are many valuable trees—eucalyptus, blue gum, red gum, iron bark, stringy bark, acacia, cabbage, palm, karri, jarrah, kangaroo grass, and saltbush. Pasture is great source of wealth; sheep and cattle largely raised. Australia is greatest wool-producing country in world, Australian merino wool is longer in staple and heavier than any other; cattle-rearing has greatly developed recently, through spread of frozen meat trade. Rabbits have become a pest. Chief crops are wheat, hay, potatoes, corn, oats, barley. Grapes, bananas, and other fruits, sugar-cane, cotton, and tobacco are grown; wine industry is rapidly growing. Minerals include gold, silver, copper, tin, coal, iron, manganese, antimony, cinnamon, rubies, sapphires. Australia is third gold and silver producing country. Coal is worked.

Trade.—Country's natural resources have brought its commerce to largest figure, in proportion to population, in world; bulk of trade carried on with Brit. Empire. Principal exports are wool, wheat, butter, beef and mutton, skins and hides, copper and gold; chief imports, metal manufactures, cotton and linen goods, iron and steel, apparel, machinery. Australia has a protective tariff.

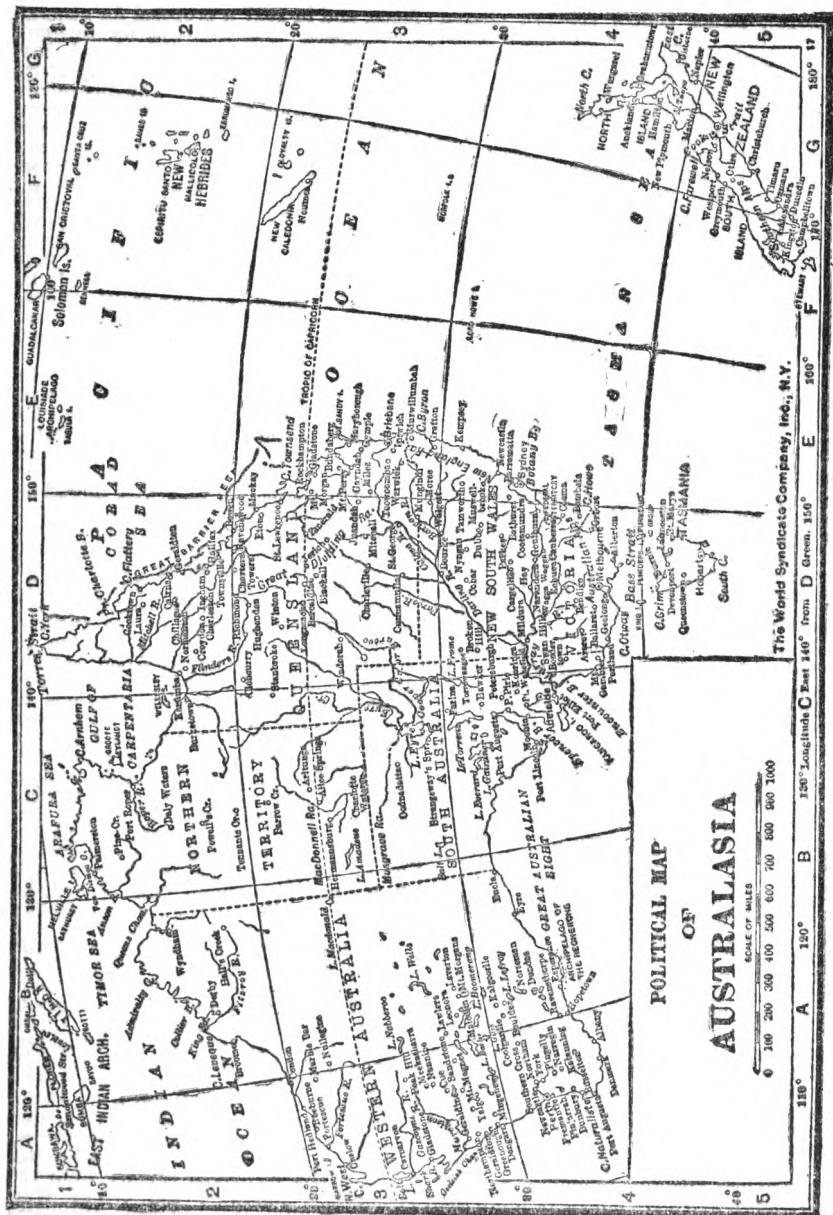
Australia has regular communication with all countries. There are cables connecting it with Java, and so with London, and with New Zealand, Norfolk I., Fiji, Fanning I., and Vancouver. Railway mileage is c. 22,000; lines run from Adelaide to Brisbane, and towards Port Darwin; from Brisbane, Rockhampton, and Townsville into interior; and from Perth to Geraldton and Albany. Transcontinental railway is being constructed from Port Augusta (S. Australia) to link up at Kalgoorlie with W. Australian line. Trans-Australian Ry. from N. to S. is also under consideration. Railways belong to states; postal communications are controlled by Commonwealth; wireless stations round coast.

History.—Date of first discovery of Australia is doubtful. A Span. explorer, Torres, sailed through strait now called after him in 1606; later in same century Tasman discovered and gave name to Tasmania; Dutch navigators explored part of western coast and islands; and Dampier explored part of W. and N.W. coasts. Captain Cook explored E. coast in 1770; expedition remained several days in Botany Bay to allow collection of botanical specimens to be made by Sir Joseph Banks and Dr. Solander, who gave name to bay; the first free immigrants appeared in 1793; four years later merino sheep were introduced. Flinders, after whom river and mountains of that name are called, surveyed in 1801 part of E. and N. coasts. Grant and Murray explored coast of Victoria about same time, and in 1837-43 *Beagle* with Charles Darwin on board, completed coast exploration. Exploration of interior began in 19th cent. with crossing of Blue Mts. by Blaxland, Lawson, and Wentworth, in 1813. Three or four years later Oxley explored Lachlan R., afterwards discovering the Macquarie. Captain King carried out explorations in Western Australia in 1821. Darling R. explored by Sturt (1828), who also explored Murrumbidgee in 1831. Sir Thomas Mitchell also explored Darling district (1833), and surveyed richest part of Victoria. Interior was explored by Eyre (1840-1) and Sturt (1845). Part of Queensland was explored by Leichhardt (1843-6), who crossed thither from

Arnhem Land (1844). One of the most successful explorers was Stuart, who made passage across whole continent from S. to N., in 1862, after two unsuccessful efforts on his part and disastrous expedition undertaken by Wills and Burke in 1861. Other crossings have been made by Warburton, Giles, Forrest, and others.

Australia consists of five mainland states, New South Wales, Victoria, Queensland, South Australia, Western Australia, with Northern Territory (federal possession); and state and island of Tasmania. Of these, New South Wales is oldest, a Brit. colony and penal settlement having been established here in 1788. Tasmania became separate government in 1825. Population increased between 1850 and 1861 from about 400,000 to nearly three times that number, owing to discovery of gold in New South Wales and Victoria. In 1851 Victoria was constituted a separate state; New South Wales and Victoria obtained right of responsible government in 1855, South Australia and Tasmania, in 1856. Queensland was detached from New South Wales in 1859, when it was established as a separate colony. Western Australia did not receive right of responsible government till 1890, when its population had greatly increased, owing to discovery of gold. Pop. 1921, 5,436,794.

The Commonwealth.—In 1901 the states were all united in a federation called the Commonwealth of Australia; Papua in New Guinea and Norfolk I. are under the federal government, which holds conquered Pacific colonies of Germans. Gov. gen. represents king, first governor being Lord Hopetoun, subsequently cr. Marquess of Linlithgow. Legislature consists of senate and house of representatives. Senate has 36 members (6 for each original state); house of representatives has over 72 members, who are elected every three years by universal suffrage; states are represented in proportion to population. Commonwealth government controls trade, finance, defence, and other national concerns; purely state affairs, including education, controlled by state parliaments. A site for the Federal capital has been chosen at Yass Canberra. Flag is dark blue ground with Union Jack crosses in upper corner, underneath that a six-pointed star, and on outer part five stars arranged like Southern Cross. There is no state religion in Australia. Education is compulsory in all states; besides state schools there are grammar and high schools and technical colleges. There are universities at Sydney, Melbourne, Adelaide, Hobart, Brisbane, and Perth.



Defence.—Since 1909 compulsory military service has been in vogue. At present forces consist of junior cadets (12–14), senior cadets (14–18), citizen forces (18–26). Legislation in 1917 made good deficiencies revealed by Great War. On June 30, 1918, Australia had a total army of 110,072 (infantry, 74,312; light horse, 10,676; artillery, 8,736). In 1903 original compact in regard to naval defence was dissolved; Admiralty guaranteed to maintain squadron on Australian station in peace time, and to train certain number of Australian seamen in return for direct subsidy. In 1909 agreed to create Australian naval force to replace squadron maintained by British Government. At beginning of Great War, Australia had the following capital ships: *Australia*, battle-cruiser; *Melbourne*, *Sydney* and *Brisbane* (light cruisers); in 1919 another light cruiser, *Adelaide*, was building, and two others (*Encounter* and *Pioneer*) were commissioned, together with eleven destroyers and other units.

The people are mainly British, favoring 'White Australia' policy. Aborigines, numbering c. 170,000, constitute distinct race, and are sometimes regarded as lowest human family. Natives of Tasmania were Papuans, and possibly original inhabitants of Australia; overwhelmed by Dravidian immigrations. Height of typical Australian aborigine is little less than that of average European; he has thick skull, long, narrow head, and receding forehead, color varies from light to very dark brown; hair black, long, and wavy. Tattooing is common; clothes often absent, sometimes skins are worn. Natives live on grubs, roots, berries, and products of chase, and are not amenable to civilization. Weapons are primitive but effective, boomerang being a typical weapon. Women are the property of their husbands, and polygamy is practised. Wives are supposed to supply their husbands with vegetables, roots, etc., and are beaten and bruised when enough is not forthcoming. Religion is little more than fear of demons, and there are certain rites practiced at different times in a man's life. Language is circumscribed but expressive; sibilants seldom occur, gutturals commoner; there are many inflections; genders are not distinguished, and they recognize three numbers—singular, dual, plural. Government of tribes is that of family, older men forming council to arrange general affairs. Only domestic animal is dog.

Australia in the Great War.—From first to last Australia mobilized, enlisted, or trained 420,000 soldiers, or more than one-twelfth of the entire population, of whom over 320,000 saw active service.

This remarkable effort was achieved by voluntary means, for compulsory military service applied only to home defence, and in 1917 a proposal for general conscription was defeated by referendum. Besides, Australia placed her resources at the disposal of the Brit. and Allied governments. The Australian navy undertook the capture of the Ger. possessions in the Pacific, and within a few weeks the Brit. flag was flying over the Bismarck Archipelago, Solomon Islands, Marshall, Carolines, Pelew, and Ladrone group. While escorting Australian and New Zealand troops to Europe, H.M.A.S. *Sydney* (Nov. 9, 1914) destroyed the Ger. raiding cruiser *Emden* at the Cocos or Keeling Islands in the Indian Ocean, after an exciting fight. Subsequently the Australian navy operated with the Grand Fleet in the North Sea.

The first Australian troops arrived in Egypt at the end of Nov. 1914, and assisted in repelling the early attacks by the Turks on the Suez Canal (Feb. 1915). As the Australian and New Zealand Army Corps they fought through the Gallipoli campaign, and won imperishable renown. After the withdrawal most of them were sent to France (April 1916), and were soon engaged in the first battle of the Somme, attacking Pozieres and Guillemont on July 22. In the early summer of 1917 they assaulted the Hindenburg Line, and in the autumn were in the thick of the fighting in Flanders around Polygon Wood, Menin, Broodseinde, and Passchendaele. There were now five Australian divisions in France. They barred the way to Amiens in the spring of 1918, and on July 4 at Hamel, under their new commander, Sir John Monash, himself an Australian, began a series of victories, including notably the storming of Mont St. Quentin, the key to Péronne (Sept. 2), the outposts of the Hindenburg system (Sept. 18), and the breaking of the Beaurevoir-Fonsomme line E. of Le Catelet (Oct. 3). In the East, Australian troops took part in the advance into Palestine, being conspicuous at Katia and Oghratine (April 23, 1916); Maghdaba and El Arish (Dec. 23); Rafa (Jan. 9, 1917); and first and second battles of Gaza (March and April 1917). Under General Allenby they were instrumental in the capture of Beersheba (Nov. 1917), Jerusalem (Dec.), Jericho (Feb. 1918), and Damascus and Aleppo (Oct. 1918). During the war Australian troops won 63 V.C.'s. Their casualties numbered 58,132 killed and 135,684 wounded.

Australia recovered rapidly from the conditions following the World War, although, like other countries, there was a period of economic depression and

difficulty. The Cabinet was reconstructed in December, 1921, with William M. Hughes as Prime Minister. Mr. Hughes' ministry was defeated in February 1923, and he resigned. In 1921-2 the total imports from the United States amounted to \$64,776,548, and the exports to the United States, \$19,193,614. In 1920-1 the imports from the United States amounted to \$120,985,720, and the exports to the United States to \$31,461,017. See MAP AUSTRALASIA.

AUSTRASIA (Kingdom of East), name of part of old Frankish dominions, subsequently merged in Germany.

AUSTRIA-HUNGARY, former empire, Central Europe (42° 51' N., 9°-27° E.); territories included Cisleithan dominions—viz. Empire of Austria; Transleithan dominions—viz. Kingdom of Hungary; and Provinces of Bosnia and Herzegovina. It was bounded N. by Germany and Russia, E. by Russia and Rumania, S. by Rumania, Serbia, Montenegro, W. by Germany, Switzerland, Italy. Area c. 115,822 sq. m.; was second largest empire in Europe.

History.—Country was apparently occupied in prehistoric times by Celtic tribes, of whom Taurisci have been identified with later Norici, who came into conflict with Rome in 1st cent. B.C. Other inhabitants were Germanic tribes, who had migrated hither from farther N.; among these, Cimbri and Teutons were defeated by Marius in 101 B.C. Subsequent Roman campaigns were those of Julius Caesar against Marcomanni, of Octavianus in Pannonia and Dalmatia, and of Drusus and Tiberius in Tyrol and Eastern Alps.

During decay of Roman empire, country was successively occupied by various barbarian tribes. Goths and Franks appeared in 3rd cent., Huns in 4th; Avars established themselves here in 6th cent., holding their own for about 250 years, till close of 8th cent., when they were subdued by Franks, under Charlemagne, who founded margravate of Austria and sent Frankish colonists there. A century later Hungary was invaded by Magyars, who put an end to influence of Franks; and were in turn defeated by Ger. king, Otto I., who re-established margravate, which late in 10th cent. was granted by Otto II. to Leopold, Count of Babenberg. Babenberg family governed Austria till 1246, when became extinct with death of Duke Frederick, slain in battle with Magyars. Emperors meanwhile belonged to Saxon, Franconian, and Hohenstaufen families. On Duke Frederick's death, disputes arose as to succession to his dominions Austria and Styria, which were finally sequestered by Emperor Frederick II.

and transferred to Otto of Werdenberg, subsequently taken by Otto of Bavaria; and then by Ottokar of Bohemia, who also acquired Carinthia and Carniola (1269), but later lost all his dominions to Rudolph of Habsburg, who was elected Ger. king in 1276.

Rudolph had them made hereditary in Habsburg family, and they were conferred on his sons Albrecht and Rudolph at Diet of Augsburg, 1282. Austria and Styria were then governed by Albert and his descendants; Carinthia, which was granted Meinhard of Tyrol in 1286, reverted to Habsburgs in 1335; while Tyrol, Istria, and other territories were also added to Habsburg dominions at various dates.

After death of Rudolph IV., in 1365, his brother, Albert III., took over Austria and Carniola. Leopold III., another brother, took Styria and other territories, but in war against Swiss was slain at Sempach (1386), whereupon Albert III. temporarily administered his dominions, presently transferring them to his nephews, Leopold's sons; family continuing to hold Styria, while elder branch had Austria. Albert V. of Austria added Bohemia and Hungary to his dominions by marriage with Elizabeth, daughter of Emperor Sigismund, king of these countries (1437); became German king (1438); imperial crown henceforward held by Habsburgs till 1740. At death of Albert's (posthumous) son Ladislaus, in 1457, Austria passed to surviving Habsburg princes, and ultimately to Emperor Frederick III., but Bohemia and Hungary elected as their kings George Podebrand and Matthias Corvinus respectively; latter invaded Austria (1477), and took Vienna, which Maximilian, son of Frederick III., afterwards recovered. Austrian territories were restored to Frederick III., by Treaty of Pressburg (1491), when also succession to Bohemia and Hungary was entailed on Habsburgs, on extinction of male descendants of Ladislaus, son of Podebrand, who had been elected King of Hungary on death of Matthias Corvinus. Maximilian succeeded his father in 1493; he had already acquired Netherlands by marriage with Mary of Burgundy, and been elected Roman king in Frederick's lifetime; reign marked by reforms in empire and advance of Habsburgs.

Reformation began in this reign and continued in that of Maximilian's grandson, Charles V., who succeeded him in 1519 as archduke of Austria, and as emperor. He aimed at establishing Roman Catholicism; and was the most powerful ruler in Europe, holding also Spain and Netherlands. The Austrian territories he handed to his brother,

Ferdinand I., while Spain and Netherlands passed to his son, Philip II. of Spain. Ferdinand I. was married to Anne, daughter of Ladislaus of Bohemia and Hungary, in whose right he had succeeded to Bohemian throne in 1526; but his claim to Hungary was disputed, and he obtained only royal title and part of W. Hungary, N.E. being held by John Zápolya, S.E. by Turks. He adopted policy of toleration towards Reformation, which was also pursued by his son, Maximilian II., who succeeded him in Austria, Bohemia, and Hungary in 1564.

Austria-Hungary in 16th Century.—In 1576 Maximilian II. was succeeded by his son, Rudolph II. who tried to put down Protestantism; which led to open revolts in various parts of his dominions. In his reign Turks under Sultans Amurath and Mohammed invaded Hungary, supporting rebels there and practically establishing independence. Rudolph, who concerned himself less with political affairs than with study of alchemy and astrology, was in 1608 compelled to cede Austria-Hungary and Moravia to his brother Matthias, to whom crown of Bohemia was also transferred in 1611. Matthias made concessions to his Prot. subjects and re-established authority in Austria (1609).

At Rudolph's death in 1612, Matthias obtained imperial crown. Being childless, he succeeded in entailing his dominions on his cousin, Ferdinand of Styria, who became emperor (Ferdinand II.) at Matthias's death (1619). Protestants in Bohemia and Hungary, however, rejected him—Bohemia choosing Frederick, Elector Palatine, as king, whereupon Thirty Years' War broke out; after battle of White Mountain (1620) Elector fled, and Ferdinand was reinstated in Bohemia. War later assumed European character, cause of Protestants being aided by Denmark. Ferdinand, for whom Wallenstein raised large army, was predominant in his dominions by 1629; extirpated Protestantism, issued Edict of Restitution, restoring Catholics to Church offices. He was now opposed by Gustavus Adolphus of Sweden, who was subsequently joined by John George of Saxony; combined army defeated imperial troops at Bartenfeld (1631), and at Lutzen (1632). In 1634 emperor's son Ferdinand defeated Swedes at Nordlingen; he succeeded his father as Ferdinand III. in 1637. War continued for many years, becoming struggle of France and Sweden against Austria and Spain; ended by Peace of Westphalia (1648), whereby Calvinism was recognized and advantages secured to Protestants.

Ferdinand III. was succeeded in 1657 by his son, Leopold I., who persecuted Hungaria Protestants; which led to war

against Turks, from whom he gained Transylvania, most of Hungary, part of Slavonia, and Croatia by Treaty of Carlowitz (1699).

The 18th Century.—Leopold died in 1705, before close of War of Spanish Succession; his son and successor, Joseph I., made treaty of neutrality for Italy with Louis XIV.; his principal work was pacification of Hungary; d. 1711, succeeded by brother Charles VI., whose chance of succession in Spain ended with Peace of Utrecht (1713). He joined Quadruple Alliance; exchanged Sardinia for Sicily; became involved in war with Turks on behalf of Venice, which resulted in addition of part of Bosnia and Serbia to Austrian dominions; issued Pragmatic Sanction (1720), with object of securing succession of his daughter, Maria Theresa; warred against France (1733-8) on question of Polish succession; towards end of reign again involved in war with Turkey, to whom he lost Serbia; d. 1740.

On death of Charles (1740), Spain, Saxony, and Sardinia sought to dismember the empire, while Charles, Elector of Bavaria, claimed (*inter alios*) to be heir to whole, and the War of Austrian Succession began. Maria Theresa, though gifted and patriotic, was young and inexperienced. Prussia, which had guaranteed Pragmatic Sanction, led attack by occupying Silesia; Austrian general, Neipperg, was defeated at Mollwitz (1741). France, also guarantor of Pragmatic Sanction, now made treaty with Prussia for partition of empire and appointment of Elector of Bavaria as emperor with diminished realm; Linz was captured, and Elector became Charles VII.; Maria, however, made touching appeal to loyalty of her Hungarian subjects, and bought off Frederick the Great by secret cession of Silesia (Oct. 1741); he repudiated the treaty, but ceased to prosecute war with vigor. On death of Charles VII. (1745), Maria Theresa's husband was elected emperor as Francis I.; war ended with Peace of Aix-la-Chapelle, whereby Maria Theresa was recognized as Queen of Austria, but had to confirm Frederick of Prussia's acquisition of Silesia, and cede her Ital. duchies to Philip of Spain, Savoy and Nice to Sardinia. Her subsequent attempt to recover Silesia resulted in Seven Years' War (1756-63), which, ending with Peace of Hubertsberg, left position unchanged. She thenceforth devoted herself to internal affairs, reforming government, education, Church, and improving commercial and industrial conditions.

Francis I. d. in 1765, and their son became emperor as Joseph II., and joint-ruler of Austria with his mother. Maria

Theresa acquired Galicia and Lodomeria by partition of Poland, 1772; she *d.* in 1780. Joseph tried to unify his dominions by doing away with distinctions of language, etc.; he did much to ameliorate condition of lower classes; declared Roman Catholicism to be state religion, but tolerated other religions; his reforms induced revolts in Tyrol and Netherlands; he was unsuccessful in war against Turks; *d.* 1790. His brother and successor, Leopold II., put down revolt in Netherlands, and made peace with Turks and Prussia, who had allied themselves against Austria. On outbreak of Fr. Revolution he formed alliance with Frederick William of Prussia (1792), but died soon afterwards. His son, Francis II., succeeded him; he warred against France, and was party to second division of Poland (1793); defeated by Napoleon Bonaparte (1796); acquired Venice, but lost Austrian Netherlands by Treaty of Campo Formio (1797); subsequently lost much to France; proclaimed hereditary emperor of Austria as Francis I. (1804); two years later resigned crown and government of Holy Roman Empire.

The 19th Century—By Treaty of Pressburg (1805-6) he lost Venice to Italy, Vorarlberg, Tyrol, etc., to Bavaria; by Peace of Schönbrunn lost further territories (Galicia, Salzburg, part of Bohemia, Croatia, etc.) to France, Russia, Saxony, and Rhine Confederation (1809). Metternich now became chief minister; formally declared war against France (1813), whereupon alliance formed between Austria, Prussia, Russia and U.K., with ultimate result of Napoleon's defeat and abdication in 1814. By Congress of Vienna, Austria then regained her possessions in N. Italy, acquired Lombardy, and precedence in new federal diet of Germany.

Francis I. *d.* 1835; reign of son, Ferdinand I. (1835-48), marked by risings; national movement commenced in Hungary (inspired by Szechenyi, Kossuth, Deák), and in Croatia and Bohemia; revolution in Cracovia led to its annexation (1846); Fr. revolution (1848) caused fall of Metternich from power, and forced emperor to grant power to Diet to establish constitutional government, freedom of speech, press, etc. Czechs were fully enfranchised. Meanwhile, Lombard insurrection commenced at Milan, and every Austrian state armed itself to win independence; emperor fled and abdicated (Dec. 1848) in favor of nephew, Francis Joseph; revolutions quelled (1849); emperor hastened to forestall action of Diet by himself promulgating constitution, suppressed in 1852; retrogressive and repressive policy; war of Italian independence broke out (1859); Lombardy lost,

and Austrian rulers of Modena, Parma, and Tuscany expelled (1859); constitution again granted (1860-1), but bitterly opposed by non-German provinces. Decisive defeat by Prussia at Königgrätz led to Treaty of Prague (1866), by which Austria lost Venice, and her status in Germany; continued revolts in Hungary led emperor to grant autonomy (1867), by celebrated compromise; dualist system of Austro-Hungarian monarchy led to great discontent, particularly of Slavs, and Austria had to consider advisability, or even necessity, of turning her empire into federation.

Reichsrath was made independent of provincial diets by Liberal centralist ministry (1873), which strengthened Ger. minority and introduced religious and legal reforms, but was involved in financial scandals of 1873. Austria strengthened her position by alliance with Germany (1879); invited by Berlin Congress, she occupied Bosnia and Herzegovina (1879), and supported by Germany and disregarding the expostulation of the powers, annexed them (1908). The ministry of Taaffe (1879-83) favored federalism and, at same time, autocracy. Czechs, conciliated, sent deputies to Reichsrath; their language was made official language in Bohemia, and Czech Univ. founded at Prague, despite opposition of Germans. Alliance with Italy (1882) freed Austria from fear of aggressive party of *Italia Irredenta*, which sought the union of Ital.-speaking districts with Italy; foreign ambitions of Austria since Sadowa directed to East, but energies absorbed in keeping together heterogeneous empire. Elements of opposition in interior combined to win electoral reform (1896) which merely enraged Socialists and Nationalists by its insufficiency. Hungary meanwhile had been faced with similar problems; she granted to Croatia its own language as official tongue and fair representation in Hungarian Parliament (1868), and strove to keep balance even between ruling Magyar and subject peoples of Hungary till retirement of Deák (*d.* 1876). His successor Tisza sought to make Hungary balance Austria, and to establish Magyar supremacy in Hungary, thus winning hatred of Croats and his own fall (1890). After his fall reforms went forward; religious toleration secured. By this time Tisza had made Hungary chief member of dualist system. Universal suffrage was established in 1907.

After the Balkan peoples had defeated Turkish tyranny in the war of 1912, it was Austria, with her ally Germany, which induced Bulgaria treacherously to attack Serbia, and, when the latter had won the war, robbed her of access

to the Adriatic by insisting upon the creation of an independent Albania, under an Austrian prince (1913). (For international situation on Continent in 1914, see under EUROPE.) The desperation of Turkey and the resentment of Bulgaria were used by the Ger. powers in furtherance of their 'Middle Europe' policy, which envisaged a German hegemony of the Balkans. The Serbs were the only irreconcilables, and the crime of Serajevo (June 28, 1914), which ultimately led to the Great War, became the pretext for the destruction of Serbia. The subsequent course of events in the Balkans will be found under WORLD WAR.

In that struggle Austrian armies suffered their accustomed fate of reverse and defeat, and it was only by the 'stiffening' given to them by Ger. assistance that they were able to endure. As an ally Germany found Austria more of a drag than a help; in Ludendorff's vivid phrase, Germany was tied to a corpse. After the death of the aged emperor Francis Joseph (Nov. 21, 1916), disintegration of the 'ramshackle empire' rapidly set in, but although economically and politically the situation was desperate, Austria was securely tied to the Ger. chariot, dare not conclude a separate peace, and much as her statesmen, especially Count Czernin, tried, could not secure peace except on terms of complete surrender. When collapse came, the various nationalities of the dual monarchy became separate states. The Czech-Slovaks had already been formally recognized by the Allies (Aug. 1918); the Ruthenes and the Slavs claimed independence also; and Hungary sundered its connection. A German-Austrian republic was proclaimed on Nov. 12, 1918, with a national constitutional assembly of a single chamber elected by universal suffrage, which authorized the Peace Treaty (Sept. 10, 1919). See MAP CZECHO-SLOVAKIA, AUSTRIA, HUNGARY.

AUSTRIA, Republic of, one of the new divisions of Europe created by the outcome of the World War of 1914-18. Austria is a remnant of the once great Austro-Hungarian empire and was the center of its power; in fact, Austria, with Vienna, its capital, was the empire. Once a territory covering 115,822 square miles, Austria has now an area of only 30,766. With Germany as its neighbor on the west and north, Czecho-Slovakia on the north and east, Hungary on the east, Serbia and Italy on the south, she occupies an insignificant position in Central Europe when contrasted with the dominating place she formerly held in the territory of 261,259 square miles that constituted the Austro-Hun-

garian Empire. She has not only been reduced in area and population, but since the war has endured economic reverses that have been rarely, if ever, experienced by other countries. Her misfortunes have been largely due to the alienation of those of her neighbors who were integral parts of the dismembered empire. The areas of which Austria was deprived by the war's result were those on which Vienna and the manufacturing towns depended for their food, and the new provinces comprising these sections were averse to supplying Austria's needs, having troubles enough of their own. They held the means of communication into Austria, not only the seaports, but much of the railroads and the Danube.

Austria became the most pressing of European problems in the post-war era. Her capital contained 30 per cent. of her population, and the distribution of her people was thus unbalanced and difficult of economic adjustment. She had lost by the war an immense production and great fertile areas of foodlands. Her currency collapsed and there was a breaking down of every economic function. Several European powers and banking interests, however, finally came to her aid in 1922 to rescue her from the imminent danger she then faced of perishing as a national entity. The provision of substantial loans for stabilizing the currency (which had sunk so low that living costs rose to unheard-of heights and caused national starvation) and for rebuilding the economic structure at last gave promise that Austria would ultimately achieve normal conditions in her industrial and social life. There has even been ground for the hope that Vienna, once the empire's financial and commercial center, will recover her business activities when the bitterness of the war and post-war periods have lessened. American aid through the Relief Fund organized by Herbert Hoover was the most conspicuous feature of the efforts made to alleviate Austria's distress. Her outlook, perhaps, has been bettered by the ruinous consequences of the war in that she has been freed from discordant racial elements and her people are now virtually homogeneous, a condition certainly favorable to social and political peace. As to her national activities in production and trade, Austria's abnormal economic condition, in crippling them at their foundations, has reduced them to an insignificant place in her post-war history. Her population 1920, was about 6,000,000.

AUTHORS' LEAGUE OF AMERICA, an organization formed for the protec-

tion of the interests of authors and others engaged in the production of works of art. Its special interest is with reference to copyright. The League gives advice to its members and provides confidential information in regard to publishers, managers and others engaged in the sale of copyright material. An Authors' League Fund is allied with the League, the purpose of which is to furnish assistance to authors and others in temporary financial difficulty. Annual meetings are held and at these questions affecting publishers and writers are discussed.

AUTOBIOGRAPHY, a man's life written by himself. From beginning of literature men have in some form written autobiography which fulfils two human needs, gossip and confession; instinct of autobiography extended to public events produces memoirs, chronicles, and history. Autobiography includes diary kept for private purposes and set account destined to be presented to world, and may be of nature of annals (narrative of events), or account of thoughts and feelings. Among the ancients we find few examples of deliberate autobiography. In the O.T. the lyrical element appears in the Psalms and Solomon's Song. In the N.T. Paul is his own biographer. Xenophon and Caesar wrote of themselves in the third person, and these autobiographies, like the letters of Cicero and the younger Pliny, enable us to construct vivid pictures of life and events of these times. The first memorable autobiography, in the strict sense of the word, is the *Confessions* of St. Augustine (c. 397), a work of an accomplished literary art, the precursor of Thomas à Kempis's *Imitatio Christi*, Bunyan's *Grace Abounding*, and Newman's *Apologia*. Two great autobiographies are the Letters of Erasmus, and that of the versatile, unscrupulous, and often unvarnished artist, Benvenuto Cellini (1500-71).

Other books which take form of autobiography may be mixture of fiction and confession, as Sterne's *Sentimental Journey*; or purely fictitious, like *Don Quixote* or *Gil Blas*, where device gives attraction of verisimilitude. Early autobiographies usually simple annals which are invaluable historically; they became common in England in 17th cent., when, besides famous diaries of Evelyn and Pepys, autobiographies were frequently written by unimportant people like Mrs. Alice Thornton (*Memoirs*, Surtees Soc.), and throw light on manners and customs. Important autobiographies of 17th, 18th, and 19th cents. are Wesley's *Journal*; Gibbon's *Memoirs*; Walpole's *Short Notes of my Life*; Rousseau's *Confes-*

sions; Silvo Pellico's *Le mie Prigioni*; Goethe's *Aus meinen Leben*; Coleridge's *Biographia Literaria*; *Autobiography of John Stuart Mill*; De Quincey's *Confessions of an English Opium Eater*; Marie Bashkirtseff's *Journal*; Italian poet Alfieri's *Autobiography*; Ruskin's *Procterita*; Mark Pattison's *Memoirs*.

AUTOCHTHONES, natives of the soil, as distinct from settlers; name used by the Greeks.

AUTOOCRACY, despotic power vested in a single individual, like that of Russia; government by aristocracy, being government by the privileged few; while democracy stands for government by the many.

AUTO-DE-FE ('act of faith'), grim ceremony of the Span. Inquisition in putting to death heretics. The first a. took place in 1481, the last in 1826.

AUTOGRAPH, document written or signed by a particular individual or a separate signature. A. signatures to documents were common from the earliest times, as may be seen from the papyrus seals and waxen tablets recovered from the ancient Egyptian tombs, and from the ruins of Pompeii and Herculaneum. The employment of a monogram, or sign manual, in place of the full a., became common about the reign of Charlemagne, and continued in use for some considerable time, but eventually gave place to the custom of using seals. Later it became usual to append the signature in addition to the seal.

AUTOGRAVURE or photogravure, photographic process by which engraved negative is obtained from which prints can be made.

AUTOHARP, musical instrument of unequal chords like harp; when certain chords are pressed down rest form chord.

AUTOLYCUS (classical myth.), s. of Hermes; noted as a thief and swindler; hence the derivation of A. in Shakespeare's *Winter's Tale*, who claimed to be a 'picker-up of unconsidered trifles.'

AUTOMATISM, involuntary action; the theory that consciousness does not control one's actions.

AUTOMATIC HEAT REGULATORS, more properly automatic temperature regulators, are devices used in connection with heat generating apparatus to maintain a constant temperature of the object heated. The use of such regulators on house heating systems, incubators of various kinds, drying rooms for lumber, fibre and paper products is quite common. Usually the

regulator consists of some mechanical element sensitive to temperature variations, which controls either directly or by means of contacts and electromagnets, some force sufficiently large to operate a damper, steam valve, gas valve or whatever is necessary to vary the amount of heat generated. The force employed may be derived from almost any source, usually falling weights, spiral springs or air or water pressure is used. The controlling element is often composed of two strips of dissimilar metals having different coefficients of expansion, riveted or welded together. Such a composite strip will bend in one direction when heated and in the other when cooled, and forms a convenient controlling device called a thermostat. When a regulator is fitted to a domestic heating furnace, oftentimes a clock is incorporated in the system so as to open the dampers, and thus warm the house before the occupants arise in the morning.

AUTOMATIC PISTOL. See PISTOL.

AUTOMATIC TELEPHONE SYSTEMS permit the user himself to make all the necessary connections between his own telephone and that of the person called. By so doing it eliminates the central telephone operator, makes for speedier and more accurate connections and greater secrecy. The detailed mechanism of the system is too complicated to be described here. Briefly, however, the apparatus consists of the usual telephone instrument on which is mounted a dial, the circumference of which is perforated by numbered holes. To make a call the receiver is lifted from the hook, and for each digit of the desired number the finger is inserted in the hole designated by the proper number, the dial rotated to the stop, and freed; when it returns to its original position by a spring. This sends a series of impulses over the telephone line and actually relays in the central station, these in turn energize magnets which actuate a series of switches, thus making the proper connection to the party called. Establishing the connection automatically rings the called telephone, which ringing continues until either the call is answered or is cancelled by the receiver of the calling station being replaced on its hook. When the called wire is busy, the person calling is so advised by an unmistakable hum.

AUTOMOBILES. An automobile is a vehicle which travels without tracks and is propelled by energy developed by a prime mover within the vehicle. This definition would include farm tractors and the 'tanks' used in warfare, but this

article limits itself to a general discussion of vehicles used either for pleasure or for commerce. Although the automobile in its present form is of very recent origin, attempts to produce self-propelled vehicles have been made, with considerable success, for many centuries. As far back as the sixteenth century John Hautach built a carriage which was propelled by coiled springs. In 1680, Sir Isaac Newton suggested the construction of a vehicle which should be driven by the reactive force produced by a jet of steam issuing at the rear of the carriage. In 1770, Gugnot, a Frenchman, built a steam car capable of carrying two passengers at a speed of four miles per hour, and twenty years later, Nathan Read, an American, built and patented a horseless carriage driven by steam. During the first thirty years of the nineteenth century, there was a remarkable outbreak of inventive activity along these lines in England, and many vehicles worthy of the name of automobiles were successfully constructed. In 1802, Richard Trevithick built a steam carriage which travelled from Camborne to Plymouth, a distance of ninety miles, and in the following year, a second model, having wheels ten feet in diameter, attained a speed of ten miles per hour. Many other inventions followed, and by 1831 a steam carriage was running steadily from Cheltenham and Gloucester, covering 3500 miles in four months, and carrying a total of 3000 passengers. In 1830, a car was built which ran 800 miles without a breakdown and could climb hills at 24 miles per hour, and between that time and 1836 regular services were in existence between London and Greenwich, London and Stratford, London and Windsor, and even London and Birmingham. The inventors met, however, with much opposition. Coach proprietors were naturally hostile, but the strongest opposition came from the railroads. Finally, in 1836, a bill was introduced into Parliament compelling every self-propelled vehicle to be preceded on the roads by a man carrying a red flag. This bill killed further enterprise, and in a few months steam carriages had passed out of existence. Little progress was made in the construction of self-propelled vehicles until 1885, when Daimler, a French engineer, applied his gas engine to a bicycle. In 1894 Panhard and Levassor built a car driven by Daimler's engine, and in the same year the first automobile race, held between Paris and Rouen, was won by the De Dion-Bouton steam tractor. In 1895, the Paris-Bordeaux race was won by Levassor in a Daimler car, covering 735 miles at just under fifteen miles per

hour. From that time onwards the progress in automobile construction has been extraordinarily rapid.

In America, no history of the automobile industry could be considered complete without mention of the famous Selden patent. In 1895 George B. Selden, of Rochester, N. Y., obtained a patent for applying an internal combustion engine to the propulsion of a vehicle. So broad were the claims that they gave the owner a dominating power over the industry. The Association of Licensed Automobile Manufacturers (A.L.A.M.) was formed to protect the patents, and no manufacturer could operate without a license from this association.

Steam Car.—The ability to generate terrific torque for instantaneous applications puts the steam car in a class by itself for acceleration and hill climbing. These qualities are much in demand by the American motorist. Will the steam car some day in the near future come into its own and at a cost within the reach of the average pocketbook, put into the hands of the driver this tremendous acceleration and hill climbing ability without the disadvantages which have blocked the progress of the steam car to such an extent that the internal combustion engine driven vehicle has far outstripped it in the race of supremacy? There was a time back in the early days when the two were neck and neck. It was a question as to which would be the eventual car, the steam or the internal combustion type. Is this question going to come to the front again? Are we on the eve of some important developments in steam car construction which will make it possible to market the steam car in competition with the present types of gasoline cars with some hope of success?

One of the great objections to the early types of steam cars, was the necessity of frequent replenishment of their water supply. In the present day steam cars this trouble has been eliminated by effective condensing systems, which keep the water supply intact for periods ranging from 200 miles to 1,000. Furthermore improvements in this respect are being made all the time so that operational care of the steamer is no more difficult than that of the gasoline driven vehicle.

The next popular objection to the steam car has centered around the real or supposed great danger inherent in that type of vehicle. This condition has been entirely obviated by automatic protective equipment, which has removed the sources of danger. The

most certain proof of this is found in the fact that insurance rates on modern steamers are exactly the same as for similar protection extended to the gas car. It must be remembered that in most modern steamers, kerosene or even fuel oil, a still heavier product of petroleum is employed. These fuels are less inflammable than gasoline, so that the objection on the score of danger, like that with regard to the low mileage on water, may be considered to be a thing of the past in properly designed steam cars and the sweeping away of these objections is what has brought us to the point of where we can again open the question of whether or not the steam car will some day come into its own and be as common on the streets of our cities as the gasoline car of the present day.

Whether this will ever be true or not seems to be wrapped up in the question of boiler design. To design a boiler which will produce steam quickly enough and at pressures sufficiently high to give the desired performance is one of the most difficult problems, that engineers have ever had to consider. In order to develop the steam rapidly, the water in the boiler has to be spread out thinly over a great area. Tremendous heat has to be employed and this condition is one which lends itself very readily to the burning out of boiler tubes if proper precautions are not taken to keep the tubes clean or to keep them full of water. Scores of inventors are now at work on boiler designs which will fill all of the requirements and yet will not have the objection of burned out tubes. Inventions are also under way to render the boiler more accessible, so that if a unit of any kind needs replacement that the work will be simple. Once the problems which are involved in the boiler design are solved, the steam car will make tremendous strides.

During the war, the English employed a great many steam trucks for transportation of men and material. These steamers gave a good account of themselves and were very satisfactory from a transportation standpoint. Throughout the mountains of our own country, you will find scores of steam motor buses, in daily use, giving the fine satisfaction because of their great hill climbing ability and smoothness and quietness of operation. The fact that the average two-cylinder steam car has only fifteen moving parts as compared to the great numbers of moving parts on a multi-cylinder gasoline engine is one of the arguments which steam car manufacturers use to great advantage in talks to prospective buyers.

When it is considered that in the

steam car the clutch and transmission are done away with, some of the disadvantages which the boiler undoubtedly has are neutralized. On the other hand, however, we have the problems of automatically taking care of all the complications involved in the handling of steam at a working pressure of 600 pounds per sq. in. This objection of course, is met by the steam car man with the reply that the pressures at explosions run many times this amount with the internal combustion engine.

On a steam car, it is necessary to have automatic controls which will shut off the fuel when sufficient steam has been generated. This device is called the steam automatic. There must be another device which regulates the feed water as it enters the boiler, so that the water level in the boiler does not drop as steam is used for driving the car. There must also be automatic air pressure which supplies the fuel to the main burner.

The old objection of requiring a long time to steam up in the morning does not seem to be brought up so much now as it used to be. In cold weather, if the pilot has been turned off for a week, it is possible to start a steam car easily within ten minutes and provided the pilot has not been turned off over night, steam will be up sufficiently to get started the next morning regardless of how cold the weather has been during the night. A number of other minor objections such as cleaning the burners and the complication of control units are not really as essential as they would seem to be, as actual experience has shown that it does not take very long to learn how to drive a steam car.

Tremendous steps in boiler construction have been made and the steam car has been cleaned up insofar as its plumbing or piping is concerned to a marked degree. For a long time, the other chassis details of the steam car lagged behind the chassis improvements in the gasoline vehicles. Even the bodies were not up to the gasoline car in appearance. All of this has been changed so that a steam car is now just as easy to drive and just as good to look upon as the internal combustion type, but we must have boilers which are infallible and which stand up for several years without repairs and replacements and we must have accessibility of the units. When all of this comes, there are going to be many more people driving steam cars than one would ordinarily suppose at the present time.

In 1904 the legal right of the Association was challenged, the fight being led by Henry Ford. Costly litigation ensued, which lasted until 1908, when

finally the necessity for the license was denied.

Types of Car.—The automobiles in use at the present time may be classified into (1) Steam Cars, (2) Electric Cars, (3) Gasoline Cars.

Steam Cars, as the name implies, are driven by a special type of steam engine. The steam is generated in a boiler, which may consist of a copper or steel tube heated to a high temperature by a burner using gasoline or kerosene. The steam is thus generated with great rapidity, and, by ingenious automatic devices, the fuel supply and water feed vary as the demand for power rises and falls with the grade of the road or the speed of the car. No gears are required and the car is very quiet and possesses great flexibility. The delay in starting and the necessity for frequent filling of the water tank are serious disadvantages, however, while trouble with lubrication, difficulty in keeping the automatic devices in good working order and high fuel consumption are other factors which have prevented this type of car from becoming popular.

Electric Cars are driven by motors of special types supplied with electric current drawn from storage batteries carried in the body of the car. Here again no gears are required, the car is exceedingly easy to control, and almost noiseless. The great disadvantage of the type is the frequent necessity for recharging the batteries. This must be done, on the average, about once every seventy-five miles. This necessarily restricts the use of the car to purely local purposes, but as a town car the electric automobile has much to commend it and has attained considerable popularity.

The field of the electric car is not difficult to distinguish nor does it conflict with the fields for various types of gasoline or steam cars, when all factors are given consideration.

To begin with, to appreciate the uses for which the electric is peculiarly fitted, it is well to examine the outstanding and distinguishing features of the vehicle. It is, above all, simple. The running gear is much like that of the gasoline car; but the moving parts are vastly less obtrusive and decidedly fewer. The complete power and driving mechanism consists of a single revolving assembly comprising the motor armature, drive-shaft and universals and conventional bevel or worm-driven rear axle. The brakes are conventional, save that on some electrics there is a so-called magnetic brake in which the motor is transformed into a generator of high capacity for the purpose of holding back on grades, and slowing down without the use of friction brake. The control is

simplicity itself, all control of the power being by means of a single controller lever steering by conventional wheel, or by a cross lever, and brakes by pedals and in conjunction with control handle. Maintenance, is limited to recharging of the battery, occasional replenishment of water—not oftener than the radiator of a gasoline car—and care of chassis lubrication and adjustment of similar character, but much less extent, as on the gasoline vehicle.

Next in line of consideration affecting the utility of the car is its ability and ease of control. Because its speed is limited usually to less than 30 miles per hour and its mileage per charge somewhere between 60 and 75 miles, as a rule, depending upon road conditions and the size of the battery, the electric is primarily a vehicle for city and suburban use. Its wheel-base is short, nevertheless because of its improved spring construction and even distribution of weight, it rides most luxuriously on rough or smooth pavements. Its short wheelbase, furthermore gives it remarkably short turning ability adapting it to use in crowded thoroughfares, narrow streets and cramped garaging space. The electric, because of its easy control, instantaneous backing and small turning radius is the most easily parked of all cars, and can be turned without reversing in nearly any street. It has no gear to shift, whether the road be level or hilly, soft or hard. When the vehicle is stopped, no mechanism is in operation and no engine need be started in motion preparatory to starting. Confusion of the operator in emergencies is less likely to result in loss of control because a single control governs the power and another the brake. There is no shifting of the foot from accelerating to brake and no combination of foot and hand work in declutching and shifting of gears to neutral. These things are mentioned not in reproach of the gasoline car but to emphasize one of the outstanding advantages of the electric car, which is the utter freedom from consciousness of the machinery which is controlled by the operator, thus making for sociability and ease of mind on the part of the person bent on many small errands. This makes the electric peculiarly adapted to the woman who lacks assurance and nerves to drive a gas car.

The electric cannot take the place of the gasoline car as a means of exhilaration, an instrument for sport. Spectacular performance, is not attainable with the electric coach. It may take longer to drive from home to office, church or in an electric than in a gasoline car, but the difference in time, if any, is only a matter of a few minutes and in the par-

ticular field of service which it best suits, it does not matter at all. It can be garaged anywhere, without fire risk or noxious fumes. It is usually charged at home and without danger or need of special skill. A chauffeur is quite superfluous. There is no danger of freezing and no trouble in starting in the very coldest weather. When parked the closed electric can be locked as securely as a house. It is, therefore proof against theft, either of the car itself or its contents.

The electric antedates the gasoline car. An electric car was the first automobile to travel at a mile a minute. It has progressed less spectacularly than the gasoline car, but no less surely. Steinmetz, the electrical wizard, has promised an electric that can be recharged in 10 minutes. The tire builders have developed special pneumatic tires to enhance the efficiency of the vehicle and minimize the danger of annoyance from punctures. Battery service stations have now been established in nearly all towns and cities, where battery service may be purchased at a fixed rate per mile or per day, contributing to the long life of the battery—the most expensive part of the car. Home charging outfits have been so perfected that a child may put the battery on charge to continue through the night while the family sleeps, the device automatically tapering the charging rate for just the proper length of time and disconnecting itself when through.

From this general consideration of the characteristics of the vehicle it will readily be agreed that the electric is essentially a town or city car. A safe and reliable vehicle, safely trusted to any normal person. A silent, odorless, clean and comfortable conveyance, making no special demands as to costume or physical robustness. A luxurious and genteel car, acceptable to the most fastidious. In initial cost the electric may at first thought seem rather high priced; but from the standpoint of permanency of investment and continuously satisfactory service over a long period of years it has no equal.

It is particularly long-lived and can be operated and maintained for a very small charge per mile. It is the car for the home, for social calls, for church and for the woman who does her own marketing.

It is a vehicle for the business man who wants certain and reliable means of personal transportation always at his beck and call. It is essentially a utility, dressed in luxurious and appealing attractiveness.

Its social appeal is that of unostentatious good taste. Its mechanical appeal

is that of quiet, efficiency and economical simplicity. In the well-to-do family it augments rather than diminishes the usefulness of the sensitive, high-strong gasoline car.

Gasoline Cars.—The number of gasoline driven cars in use so enormously exceeds that of steam and electric cars that the word 'automobile' generally conveys the idea of a vehicle of this type. It will therefore be considered in rather greater detail than the other two. The mechanism of the car may be considered under three headings—the engine, the clutch and the drive.

The engine.—Practically all cars now manufactured are fitted with engines built on the Otto principle. This is known as the 'four-stroke' engine and reduced to its simplest terms its method of functioning is as follows. The first stroke is a downward movement of the piston which draws into the cylinder an explosive mixture of gasoline vapor and air supplied by a device called a carburetor. The second stroke is an upward movement of the piston, which compresses the mixture. At about the moment of highest compression, the mixture is exploded by an electric spark supplied by a spark plug. The explosion forces the piston down again, and just before the completion of the stroke an exhaust valve opens, and on the fourth or upward stroke of the piston the products of combustion are driven out of the cylinder when all is in readiness to repeat the cycle. The gasoline is admitted and the waste products eliminated, through accurately timed *valves*, which are usually either 'poppet' valves or sleeve valves. The poppet valve is mushroom shaped and, when closed, seats on to an accurately ground rim. It opens by rising. The sleeve valve is used in Knight engines and consists of two cylindrical sleeves, containing ports, which slide up and down between the piston and the cylinder walls. In the case of the poppet engine the valves are raised by cams mounted on a shaft which is geared to the crankshaft. In a Knight engine the sleeves are operated by a so-called eccentric shaft which connects with the sleeves by means of small rods. The eccentric shaft is geared to the crankshaft. Owing to the rapid succession of explosions, the engine becomes exceedingly hot, and some *cooling device* is necessary. The commonest is the water jacket, a continuous stream of water being pumped or syphoned through it and through a radiator, which serves to cool the water. The spark is provided by a *magneto* (which is a form of alternating-current dynamo driven by the engine) or by a *coil* and timer-distributor which draws its current from a storage battery. The

engine is started by a *starting Motor* which also draws its current from the battery, and which is geared with the fly-wheel of the engine or otherwise connected. In order to generate current to charge the battery, a generator or dynamo is driven by the engine, and is connected with the battery. The *carburetor* is a device for obtaining the required mixture of gasoline vapor and air. It consists, essentially, of a fine jet through which the suction stroke of the engine draws air and a fine spray of gasoline, which vaporizes, mixes with the air, and enters the cylinder.

Whenever the size of an engine is given it is expressed in bore of the cylinders and stroke of the pistons, the bore always being mentioned first; thus 3 x 5 means a bore of 3 inches and a stroke 5 inches. The stroke refers to the total travel of the piston from the top of its stroke to the bottom of its stroke. The bore of the cylinder is the inside diameter of the cylinder. From the bore and stroke figures we are enabled to get the cubic capacity of the engine commonly called its displacement. Displacement equals $D^2 \times .7854 \times N \times S$ in which D is the bore and N the number of cylinders and S the stroke.

Cylinder Castings.—The cylinders of engines used in automobiles are metal castings. The design of an engine can call for the casting of cylinders in various ways. They may be cast separately, that is, each cylinder cast as a unit and assembled as a unit. The cylinders may be cast in pairs, that is, two at a time, or in threes or in units, of four or six. When we speak of a block casting we mean that all the cylinders of the engine where 4, 6, 8, or 12 are cast as a unit. In the case of eight cylinder motors it is usual to cast the cylinders in two units of four each and in twelve cylinder motors of two units of six cylinders each, each unit being mounted separately in the engine crankcase. In addition to casting the cylinders as a unit it now is quite common to cast with the cylinders the upper portion of the crankcase.

Detachable Cylinder Heads.—The cylinder head is the top or head of the cylinder and this may be a separate piece bolted to the cylinder or it may be integral with the cylinder. Engines with all valves on the side employ L-head cylinders. As the name implies a transverse section through the cylinder as viewed from the side gives the cylinder the appearance of the letter L inverted. The bar at the top contains the valves along its length. When the valves are opposite the cylinders are of T-head shape and in this construction the inlet valves are on one side of the cylinders and the exhaust valves on the other. A

sectional view of the cylinder takes the shape of the letter T. This form requires the use of two camshafts, one for the inlet valve and one for the exhaust, while the L-head construction calls for but one camshaft since all the valves are on one side. In the valve-in-head construction the cylinder might be referred to as taking an L shape, that is, straight up and down with no pockets on either side. The valves are set in an inverted position in the head, that is, instead of the stems sticking downward as on L- and T-head engines they extend upward thus, requiring an operating mechanism extending from the camshaft to the top of the cylinder head outside of the engine. There is a form of construction using L-head cylinders in which one set of valves is in the head, while the other is in the pocket of the L and operated in the usual way.

The sleeve valve engine is in a class all by itself since the valves are in reality ports cut in the sliding sleeve. In eight and twelve cylinder engines it is obvious that cylinders of any form may be used, though in practice only L-head or valve in head are employed. In the case of the L-head the cylinders are so placed on the crankcase that the valves may be operated by a single camshaft placed at the base of the V formed by the cylinders. Naturally, if this one camshaft is to take the care of all the valves the sets of valves of each set of cylinders must face.

Camshaft Drive.—The camshaft or half time shaft, the shaft which operates the valves, must be connected in some way to the crankshaft. The usual method is to have the gear at the end of the crankshaft in mesh with the gear at the end of the camshaft, though in some constructions instead of gearing a silent chain is employed. The standard gearing today is the helical. In the helical gearing the teeth are slanted and slightly curved. In the spur gearing the teeth are straight and right angles to the side of the gear.

Pistons and Rings.—The piston or part which moves up and down in the cylinder, and is the first to take the impact of the explosion may be made of iron or aluminum alloy. Since the piston must make a gas tight joint in order to retain the gases above it, it is necessary that the piston be packed and this is done by the use of piston rings which are springy pieces of steel mounted in grooves in the piston. The common type of ring is known as the diagonally split. The words diagonally split merely refer to the way in which the ends are cut. The step joint ring is another.

Number of Crankshaft Bearings.—The crankshaft is that part of the engine which permits the reciprocating motion

of the piston being expressed in rotary motion. It is the revolving crankshaft which turns the flywheel and the parts of the power transmitting mechanism. This shaft must be supported in the crankcase and the supports are called bearings which vary in number, depending on the design. A crankshaft may be supported merely by two bearings, one at each end, or by three with one at each end and one in the middle, or as many as seven may be used. The crankshaft bearings in every case but one are of the plain babbitt type. In the one instance ball bearings are used. Since the crankshaft revolves at high speeds and since certain forces act on it to cause vibration and misalignment various means are used to maintain crankshaft alignment. Many motorists have heard of a counter-balanced crankshaft. This refers to a shaft which is fitted with weights which are designed to offset or balance certain forces tending to distort the shaft. The vibration of the crankshaft may be reduced also by other means as by the use of a vibration damper, a special device mounted at the forward end of the crankshaft and acting as a shock absorber. Methods of reducing crankshaft vibration are getting to be more and more popular.

Cooling.—There are three types of cooling systems in use in automobile engines, the pump, thermo-syphon and air. In the pump system, a centrifugal pump operated by the engine itself forces the cooling water through the water jackets and radiator. In a thermo-syphon system no pump is used, but a water circulation maintained by reason of the fact that hot water is lighter than cold, and being such, rises to the top. As the water around the cylinders gets hot it rises to the top and thus makes its way to the radiator which cools the water which again enters the water jackets at the bottom.

In the air cooling as used in two makes, the cylinders are cooled simply by a draught of air flowing around them. The cylinders of air cooled motors are finned so that the heat may be quickly dissipated. The thermostat is a device which operates according to the temperature. In one form of construction the thermostat is placed in the water outlet and the thermostat itself controls a valve which opens and closes the water circuit according to the temperature of the water. When the water is cold the thermostat operates on the valve to close the water line. As the water temperature increases the thermostat gradually opens the valve allowing water to flow and after the engine has reached its maximum heat the valve is wide open permitting unrestricted flow. Thus,

when the engine is cold there is no water circulation at all because the line is blocked. The thermostat depends for its action on the expansion of a liquid contained in a coil or tubing. The liquid expands the tubing and the movement of the expanding tubing is communicated to the valve. The thermostat may be employed for controlling the air flow through the radiator by acting on radiator shutters instead of a valve in the cooling line. The air control may also be effected by shutters operated by hand as in the case of the Hudson car.

Engine Oiling.—The interior part of the engine must be constantly lubricated and this can be done in various ways. The ordinary splash system which is employed on only one make relies on the splashing around of the oil contained in the lower part of the crankcase. The connecting rod lower ends striking this oil cause the splashing. In this ordinary splash system the same oil uncleaned is used over and over again. An improved form of splash system, known as the circulating splash, cleans the oil before it is again returned to the crankcase, that is, there is a continuous circulation of oil and in some designs some of this oil is directed to certain parts, but not under pressure. At the same time the crankcase level may be kept constant.

In the force feed and splash there is a pump operated by the engine and this pump forces oil under pressure to the crankshaft bearings and to the timing gears, leaving the cylinders and pistons to be oiled by splash. In the force feed every working surface is oiled under pressure and there is no splash whatever. In this construction the crankshaft is drilled throughout its length, the drillings constituting oil passages for feeding the main and connecting rod bearings.

Fuel Feed.—There are three types of fuel feed systems in use called the gravity, pressure and vacuum. The gravity feed makes it necessary to have the fuel tank higher than the carburetor so that the fuel will flow by gravity. In such cases the gasoline tank is placed under the front seat or in the cowl so that the proper head may be had. In the pressure system the fuel tank is placed at the rear of the car and the fuel forced to the carburetor by means of air or exhaust gas pressure. The vacuum system which is by far the leading type permits of the main gasoline tank being placed in the rear of the chassis and at the same time not requiring an air tight gasoline tank nor any artificial pressure on the fuel in the tank. The vacuum system employs what is called a vacuum tank which has three

pipes leading from it. One of these goes to the main tank, one to the carburetor and one to the inlet manifold. The vacuum in the inlet manifold is communicated to the tank and the vacuum existing there is destroyed by the automatic entrance to fuel from the main tank. The fuel that enters the vacuum tank feeds to the carburetor by gravity.

Clutch.—See also Clutches. There are three types of clutches in use called the cone, plate and disc. The cone type is simply a truncated cone, the surface of the cone being faced with leather or an asbestos fabric. The cone fits into a similarly shaped opening in the flywheel. The plate and disc clutch may really be classed as one. In the disc clutch there are two sets of discs, one set being driven and one set driving, the former being flexibly attached to the clutch shaft and the latter to a drum fastened to the flywheel. In the plate clutch, so-called, two or three large discs or rings are used instead of a multiplicity of discs. The principle is the same in both types, the detail differing.

Transmission.—The transmission unit or gearset consists of a case or housing in which gears are mounted on shafts. This unit may be bolted to the flywheel housing or it may be incorporated with the rear axle housing or it may be mounted as a separate unit apart from either axle or engine. When bolted to the engine the combination of engine, clutch and transmission is known as a unit power plant.

Axle Type.—There are three types of rear axles: floating, semi-floating and $\frac{3}{4}$ floating. In the floating axle the axle shafts are said to float because they do not carry any load. This being the case, it is possible to remove an axle shaft without removing a wheel. In this construction the wheels are mounted on bearings which are on the axle tubes, and the shafts simply act as driving members and the tubes support the load. In the semi-floating axle the axle shafts are mounted on bearings which are inside of the axle tubes and a wheel is mounted on the outer end of each shaft. Thus the shaft must not only turn the wheels, but also support a part of the load. In the so-called $\frac{3}{4}$ floating axle the general construction is like that of the floating, but the axle shafts are rigidly attached to the wheels and are made to carry some of the load as well as turn the wheels.

Springs.—The variety on spring design is greater than that of any other feature we have mentioned. There are no fewer than nine distinct constructions, the most popular being the semi-elliptic. A spring of this form takes the shape of half an ellipse, as shown in the accom-

panying illustration. The elliptic consists of two semi-elliptical members linked to form a complete ellipse. In the $\frac{3}{4}$ elliptic the construction is obvious. In the cantilever the design resembles a semi-elliptic reversed, but the action is far different, since the spring is pivoted at a central point, while one end is attached to the frame and the other to the axle. This type of cantilever should correctly be called the semi-elliptic cantilever from the fact that the spring is of the semi-elliptic type. The construction of the quarter elliptic then is obvious. In these constructions the springs run lengthwise of the frame, but there are a number of cars in which transverse members are used. The Ford is the best example of a transverse semi-elliptic spring. This construction may be compounded as in the case of the Marmon, in which two semi-elliptic springs are placed back to back and transversely. In the platform spring suspension the construction calls for two semi-elliptic side members and a semi-elliptic transverse member which refers to the Hotchkiss drive. This means that the rear springs are required to act as springs.

Drive.—The movement of the gears is transmitted to the rear wheels either by a shaft drive, a chain drive or a worm drive. The two latter are seldom used except on trucks, where the chain drive is quite common. In the shaft drive, the main axle of the car is fitted with a pinion which gears with a toothed wheel attached to the rear axles. In order to give the main axle sufficient flexibility to withstand the movements of the car, it is fitted with universal joints or flexible couplings. An important part of the drive is the *differential gear* which is incorporated in the rear axle. The purpose of this ingenious piece of mechanism is to permit the two rear wheels to revolve at different speeds. A little reflection will show that this is absolutely necessary. As long as the car is traveling in a straight line, both rear wheels revolve at the same speed. But in turning a corner, the outside wheel has to traverse a much wider arc than the inside. In other words it must revolve more rapidly. The differential gear permits this, but the mechanism is too complicated to permit of explanation in this article. In the *chain drive*, the rear axles are fitted with sprockets driven by chains which mesh with other sprockets attached to a jackshaft. The jackshaft runs, of course, parallel to the rear axle, and is driven by a bevel pinion gear. In the *worm drive*, a screw or propeller shaft gears with a worm wheel at right angles to the propeller shaft and connected with the rear axles.

Lubrication.—The lubrication of the car is, of course, of prime importance. In the engine, a liberal supply of oil is kept continually in the crank case, circulation being effected by an oil pump, while the cylinder walls are splashed with oil by the motion of the connecting rods. The gear box and the differential housing are kept supplied with semi-liquid grease or heavy oil. Bearings throughout the car are fitted with grease cups, or are supplied with grease by means of a 'gun' which forces lubricant into the bearings under considerable pressure. Front and back wheel bearings are packed with grease, and motors and generators are lubricated frequently with light oil.

AUTONOMY (Gk. self-rule), right of bodies politic to control their own affairs. Cherished privilege of Ionian cities and colonies of Greece and of states of mediæval Germany and Italy; term now chiefly employed in describing rights of self-government enjoyed by certain subject states.

AUTOPSY, term originally and correctly applied to a personal examination; now generally to the examination and dissection of a dead body to ascertain the cause of death.

AUTO-SUGGESTION, or **SELF-SUGGESTION**, a term in modern psychology, meaning an effort to secure control over the subconscious, or unconscious mind. More popularly it is associated with faith healing, to which field, however, it is by no means limited. The practice dates back to prehistoric times; it is, in fact, the basis on which the savage witch doctor, or Indian medicine man, establishes his authority over the members of his community. Fundamentally it rests on the fact that man is possessed of two separate minds, the conscious and the subconscious. The conscious mind is that with which he performs his daily intellectual functions and efforts, which includes all that field of which he has a present knowledge, or which he may recall at will through recollection. It controls all the voluntary muscles and thought. Its instrument is the brain. The subconscious, on the other hand, man is seldom aware of. It constitutes a wide and practically unknown area, whose existence has only recently come within the recognized domain of modern science. So far all efforts to assign its physical seat to any part of the brain have failed. Some investigators, of high scientific standing, even hold the belief that it has no physical seat and that it survives bodily death. It is, no doubt, the origin of the ancient belief in the soul. The powers of the

subconscious mind are peculiar. Many investigators are convinced that it is entirely indifferent to space and that through their subconscious minds two persons, though on opposite sides of the earth, may under certain conditions hold communication, a phenomenon known as telepathy. It has been conclusively proven, however, that the subconscious mind has powers of observation over a much wider area than the conscious mind has through the ordinary senses, and that within its depths are many impressions that have not been consciously recorded by means of the physical senses. The acceptance of such impressions is known as unconscious auto-suggestion, and will be referred to again presently. Aside from this it is believed that the subconscious also keeps an indelible record of every impression that has been received through the conscious brain, by means of the senses. A second significant fact is that the subconscious mind has control over the involuntary muscles and the internal organs of the body; that it controls all that part of the physical mechanism which is essential to the well being of the body, expelling all waste matter and rebuilding those tissues which have been wasted through fatigue. Normally, it keeps the body in health, and if it were never interfered with, there would be no danger from disease from the day of a man's birth till the day of his death from old age. In spite of all these remarkable qualities, however, the subconscious mind has not the power of reasoning, that function being the monopoly of the conscious mind, exercised through the brain. The theory of those who believe in the separate existence of the subconscious as a distinct entity, surviving death of the body, is that reason is needed only in a world of matter, and is unnecessary in a purely spiritual environment, such as that in which the subconscious finds itself after death of the body. Actually, the subconscious, in material matters, shows absolute dependence on the judgment of the conscious mind and accepts its decisions without question. Herein lies the basis of the practice of auto-suggestion. Ill health, or disease, are due to two main causes. The first of these is abuse, through wrong habits, or wrong modes of living. This is a purely mechanical matter, and ultimately there is no cure for such sickness except a removal of the cause. The second cause of disease, and this is a far larger element than is popularly supposed, is unconscious auto-suggestion. Unsuspected by the conscious mind, the subconscious has come in contact with the idea of ill being, and received an impression. Like a train

darting through an open switch, it becomes confused in its control of the bodily mechanism, and ill health or disease follow. Undoubtedly abuse, through overwork, nerve strain, worry, mal-nutrition, must also be a contributing factor, since normally the subconscious mind is not susceptible to these unhealthy influences, but they need not be permanent factors. Under this second head come such diseases as neurasthenia, melancholia, all the many symptoms classed under hysteria, and often such diseases as may have material causes, such as tuberculosis, asthma, catarrh, etc. These, except tuberculosis, are what are generally known as functional diseases. The cure for them is through the subconscious mind; indeed, even conservative members of the medical profession now admit that they cannot be cured by material treatment. Such treatment, known under the general head of psycho-therapeutics, was usually accomplished through hypnotism, by means of which the conscious mind of the patient is put into a state of abeyance, the operator then directing an appeal to the subconscious, which then rises to the surface. It was Emile Coué, the French hypnotist of Nancy, who in 1922 first aroused a wide popular interest by the doctrine that the treatment could be much more effectively achieved by the patient himself, without the hypnotic sleep. Hypnotism, he contends, is nothing but suggestion to the subconscious mind of one person by the conscious mind of a second person. There is no need for a second person; the conscious mind of the patient himself may suggest to his own subconscious by 'conscious auto-suggestion.' This formula is extremely simple; the patient has simply to expel from his conscious mind all extraneous thought, then murmur rapidly 'I am getting better, I am getting better,' or any other phrase of proper significance, the thought thus expressed being impressed on the subconscious mind. The most propitious time to do this is either just before going to sleep, when the conscious mind is fatigued, or just before becoming fully awakened. While absolute faith in the efficacy of the treatment is not essential, most certainly there must be no pronounced scepticism. It will be found that the minor disorders yield quickly to this treatment, and more serious disorders may be conquered within several months or less, much depending on the temperament of the patient. Aside from physical illness, the treatment is also extremely effective in the cure of bad habits and moods.

AUTUMN, a term denoting the season

which begins astronomically when the sun enters the sign of Libra on or about Sept. 22; day and night then equal. It ends at winter solstice, about Dec. 21; known in America as 'the fall.'

AUTUN (46° 58' N., 4° 20' E.), town, Saône-et-Loire, France; bp.'s seat; XII. cent. cathedral; Rom. antiquities; cloth.

AUVERGNE (45° 20' N., 2° 40' E.), ancient province, France; now forming departments Puy-de-Dôme, Cantal, and part of Haute-Loire; united to France, 1610; mountains, volcanic structure; fertile; minerals.

AUXERRE (47° 55' N., 3° 35' E.), town, Yonne, France; formerly bp.'s seat; fine cathedral and churches; ancient walls surrounding city form site for boulevards; wine, ochre.

AVALANCHE, collection of snow or ice which descends from higher latitude. Different kinds are: (1) Drift or Dust a., which acquires tremendous velocity, causes compression of air, and becomes dangerous force; (2) Glacial a., which descends from glaciers in summer months.

AVALON.—(1) Peninsula at extreme S.E. of Newfoundland (46° 35'–48° 10' N., 52° 45'–54° 10' W.); fishing. (2) Mythical isl. in western seas, originally Welsh kingdom of the dead; in Arthurian legend the place of King Arthur's burial, sometimes identified with Glasbury.

AVARS (VI. cent.), Tartar tribe; conquered Pannonia and Dalmatia, but were subdued by Charlemagne.

AVATAR, the descent and incarnation of a Hindu deity upon earth; thus regarding the ten a's of Vishnu it is held that he has already visited the earth nine times, and that when he finally appears, as the horse Kalki, the earth will be destroyed.

AVATCHA, bay, tn., and active volcano (1827, 1837, 1855), with double peak, Kamchatka, Asia (53° 15' N., 158° 50' E.).

AVEBURY, vil., Wiltshire, England (51° 26' N., 1° 51' W.), near megalithic antiquities consisting of stone circles, and immense barrow known as Silbury Hill.

AVEBURY, JOHN LUBBOCK, 1ST BARON (1834–1913), English banker, politician, and author; s. of Sir J. W. Lubbock, Bart.; sat in parliament for Maidstone and for London University; Vice-Chancellor of latter; author *Ants, Bees, and Wasps* (1882), *Pleasures of Life* (1887), and many other works.

AVELLINO.—(1) (40° 55' N., 14°

47' E.), town, Italy; seat of bishopric. Pop. c. 24,000. (2) (41° N., 15° E.) province, Italy. Pop. 412,000.

AVE MARIA (Lat. 'Hail, Mary!'), first words of prayer used by Roman Catholics, a composite of the words used by angel Gabriel to the Virgin Mary (*Luke* 1st), those used by Elizabeth to her (*Luke* 1st), and an invocation of the Virgin's help.

AVENA, a genus of grasses comprising over fifty species (*e.g.*) the cultivated oat.

AVENTURINE, variety of quartz, occurring chiefly in Ural Mts.; also kind of glass with gold-red spangles.

AVERAGE, term used to define a service due from a feudal tenant to his superior, which was usually carriage of goods; in modern shipping it refers to loss caused by accidents in navigation, consequent loss or depreciation of cargo, and is either *general* or *particular*.

AVERESCO, ALEXANDER (1858), Rumanian soldier, began his military career in war with Turkey (1877–8). He was military attaché at Berlin (1895–8), on his return being promoted brigadier, and then chief of the general staff. As minister of war (1907) he dealt successfully with the peasant revolt, and during the war with Bulgaria (1913) he acted as chief of the general staff. On Rumania's entry into the Great War (1916), Averesco commanded the army operating on left flank in Transylvania, but he was transferred to the Dobruja to meet an invading force. In Nov. 1916, when Mackensen had compelled a general retreat, he took supreme command of Rumanian forces before Bukharest. After fall of the capital he conducted further Rumanian retreat to the line of the Sereth, and in spite of defection of Russia, stubbornly resisted all attempts of the enemy to enter Moldavia. Cut off from allies and supplies, he counter-attacked brilliantly, and in the desperate battles of Marasesti (Aug. 16–19, 1917) held the Sereth line intact, until, with Russia ranged on the side of her enemies after treaty of Brest-Litovsk (Feb. 18, 1918), Rumania was forced to surrender.

AVERNUS, AVERNO (40° 54' W., 14° 4' E.), small lake, near Naples; crater of extinct volcano. Birds flying over it were said to fall dead, and through it Vergil's Æneas descended to Hades; Vergil wrote of '*facilis descensus Averno*'; close by is cave of sibyl of Cumæ.

AVERROES (1126–98), Arab. scholar; lived in Spain and Morocco; studied math's, philosophy, theol., and med.; a profound admirer of Aristotle, A. held

that both active and passive intellect are one in all men, that religion is but the philosophy of the illiterate, that matter, an emanation from God, is eternal, and that life exists on each of the heavenly bodies.

AVERY, SAMUEL (1865), an American educator, b. in Lamont, Ill. After graduating from the University of Nebraska, in 1892, he studied in Heidelberg, Germany, then became professor of chemistry at the agricultural experiment station of the University of Idaho. In 1901 he went to the University of Nebraska as professor of analytical and organic chemistry, where he became chancellor in 1909. He has written a great number of bulletins covering experimental work at the experimental stations.

AVESAT (ZEND-AVESTA), sacred books of Parsees; four divisions; sacrificial liturgy, law, forms of worship and prayers; nearly all lost but liturgy.

AVIARY, an enclosure for keeping birds in captivity either as a pastime, or for culinary purposes, or in order to study their habits.

AVIATION, COMMERCIAL. See **AERONAUTICS.**

AVICENNA (980-1037); Arab. scholar; ed. Bokhara, then a centre of culture; studied math's and philosophy, specially Aristotle's *Metaphysics*; became vizier; his pleasure-loving life hastened his death. A's philosophy is a Neoplatonic Aristotelianism; he holds that the active intellect is one and universal and that knowledge comes from its contact with the individual passive intellect, that being may be divided into the (1) necessary of itself—God, (2) the necessary by God's decree though but possible of itself, and (3) the merely possible.

AVILA.—(1) (40° 40' N., 5° W.) province, Spain, S. part Old Castile; area, 3042 sq. miles; mountainous, centre and south; merino wool, timber; lower fertile tracts towards N.; grain. Pop. 209,000.

AVIGNON.—*Avento*, 'Windy City'—(43° 58' N., 4° 49' E.), town, on Rhone, France; founded by Phocéans, 539 B.C.; ancient cathedral and palace; residence of popes (1309-76), to whom city belonged until annexation to France, 1791; mediaeval bridge and XIV.-cent. walls; here Petrarch first saw Laura; Ville-neuve-les-A. (q.v.) is suburb across Rhone; abp.'s seat; formerly univ.; silk, madder. Pop. 50,000.

AVOCA (52° 48' N.; 6° 9' W.), river and valley, Co. Wicklow,

Ireland; celebrated in Moore's poem, *The Meeting of the Waters.*

AVOCADO PEAR (*Persea gratissima*), a luscious W. Indian fruit.

AVOCET, limicoline bird allied to the plover; color black and white; nests in mud flats.

AVOGADRO, AMADEO, CONTE DI QUAREGNA (1776-1856), Ital. physicist; discovered that (*Avogadro's law*) equal volumes of different gases, at same pressure and temperature, contain same number of molecules.

AVOIRDUPOIS, system of weights used in Britain and N. America.

AVON (Celtic, 'river'). (1) East Avon, rises in Wiltshire, enters Eng. Channel at Christchurch (50° 44' N., 1° 47' W.). (2) Lower Avon, rises Cotswold Hills, Gloucestershire; flows into Bristol Channel at Avonmouth (51° 31' N., 2° 40' W.). (3) Upper Avon, rises at Naseby, Northamptonshire; flows past Stratford; joins Severn below Tewkesbury (51° 59' N., 2° 9' W.).

AXE, weapon found with earliest human remains in Stone and Bronze Ages; now made of iron, with steel edge and wooden haft.

AXINITE (H₂Ca₂BAl₂(SiO₄)₂), clove or violet mineral, wedge-shaped anorthic crystals, found in basic eruptive rocks; occasionally used as gems.

AXIOM, an adage, or proverb; an accepted principle in an art or science.

AXIS, an imaginary line round which an object rotates, or around which a body is symmetrical; the second cervical vertebra (anat.).

AXIS DEER, variety found in India, resembling fallow deer; horns are not palmate, and have a brow tine and two end points.

AXMAN, GLADYS, an American soprano, b. in Boston, Mass. After graduating from the public schools she went abroad and studied singing, returning home she made her debut as a professional singer at a recital concert in Boston, in 1915. For several years she sang the leading soprano roles with the Aborn and San Carlos opera companies, joining the Metropolitan Opera House company, in New York, in 1919. Here she created the part of La Jole de Comprendere in Wolf's *Blue Bird*. In 1921 she appeared in a joint recital with Kubelik in the Boston Opera House, in Boston.

AXMINSTER, par. and mrkt. tn.; Devon, England (50° 47' N., 3° W.);

brush-making, etc. Famous carpet industry now transferred to Wilton; birthplace of John Churchill, Duke of Marlborough; Newenham Abbey (Cistercian) is close by. Pop. 3,000.

AXOLOTL (*Amblystoma*), larval salamanders, indigenous to lakes in Mexico and the E. and W. of the U.S.; they closely resemble the Brit. newt larvae, but attain a length of 11 in., and are used as article of food. On account of their capacity to reproduce before completing metamorphosis by losing external gills, they were for some time classified as *Pennibranchiates*; the Mexican name has now extended to branchiate newts generally. Under suitable conditions, however, the axolotl can undergo normal metamorphosis.

AXUM, AXOUM, OR AKSUM, tn.: Abyssinia (14° 8' N., 38° 44' E.), sacred city of Abyssinians; numerous remains; interesting granite obelisk. Pop. 5,000.

AYACUCHO, tn., Peru (13° 6' S., 74° 11' W.); founded by Pizarro, and known as Guamanga till 1825. Pop. 16,000.

AYALA, DON PEDRO LOPEZ DE (1332-1407), Span. soldier, historian, and poet; wrote chronicle of the four Castilian kings under whom he lived, and also some satirical and didactic poetry. He was taken prisoner by the Black Prince at *Najera*, 1367.

AYE-AYE, nocturnal animal of lemur family, found only in Madagascar; held in superstitious awe by natives.

AYDELOTTE, FRANK (1880); an American college president, b. in Sullivan, Ind. Graduating from Harvard University, in 1903, he went as a Rhodes scholar from Indiana to Oxford University, England, in 1905. From 1915 to 1921 he was professor of English in the Massachusetts Institute of Technology. Since 1921 he has been president of Swarthmore College. He is the author of *Elizabethan Rogues and Vagabonds*, 1913; *College English*, 1913; *The Oxford Stamp*, 1917, and in collaboration with L. A. Crosby, edited *Oxford of To-Day*, 1921.

AYESHA (d. 677), childless wife and constant companion of Muhammad; on his death she secured succession as caliph to her f., Abu-Bekr, 632, but they were finally defeated by Ali Ben Abu Talib (q.v.) in 656.

AYLESFORD, HENEAGE FINCH, 1ST EARL OF (1649-1719), Eng. lawyer; son of 1st Earl of Nottingham; became solicitor-general; engaged in trial of Algernon Sidney, and was counsel for King James in trial of Titus Oates for libel; one of the finest orators of his period.

AYR (55° 28' N., 4° 36' W.), royal burgh, chief town of Ayrshire, mouth of river A.; charter granted by William the Lion, 1200; famous old bridge; associated with poet Burns; town hall, academy; chief Scot. horse-racing centre; ship-building, shoemaking, carpets, etc. Pop. 35,000.

AYRES, JOSEPH GERRISH (1839-1922), rear-admiral, U.S.A.; b. Canterbury, N. H. During the Civil War he served as a lieutenant in the New Hampshire Volunteers and in 1864 entered the navy as surgeon, becoming medical inspector in 1895 and medical director in 1898. He retired with the rank of rear-admiral in 1901.

AYRES, LEONARD PORTER (1879), statistician; b. Niantic, Conn. He became a teacher in Porto Rico in 1902, later served as superintendent of schools. Thereafter (1908-20) he was director of education and statistics for the Russell Sage Foundation. During the World War he acted as statistician in several departments for the U.S. Government and received the Distinguished Service Medal. His writings embrace a variety of educational subjects.

AYRESHIRE (55° 32' N., 4° 20' W.); county, S.W. Scotland; area, 724,523 acres; famous for early potatoes, dairy-farming, cheese; coal-fields, ironworks; fireclay, limestone, and honestone deposits; carpets, tweeds, cottons, chemicals, leather, tools, fisheries; chief seaports, Ayr (chief town), Ardrossan, Girvan, Troon, Largs; watered by Ayr, Stinchar, Doon, Irvine, Girvan, etc.; hilly districts in N. and S.; chief lake, Loch Doon; represented by two M.P.'s; some Roman remains and monastic ruins; scene of Alexander's defeat of Norwegians in 1263, and of several victories gained by Wallace and Bruce over Edward I.; took an active part in the Covenanting movement; known as 'the land of Burns,' after its most distinguished native. Pop. 1921 299,254.

AYRTON, WILLIAM EDWARD (1847-1908), Eng. physicist; invented electrical measuring apparatus; Royal medallist, 1906. His wife (d. 1906) was also a scientist; author of *Electric Arc* (1902).

AYSCOUGH, JOHN, pen name of the Right Rev. Monsignor Count Francis Browning Drew Bickerstaffe-Drew (1858), author; b. Headingley, Leeds, Eng. He was educated at Litchfield Grammar School and entered the Roman Catholic Church while an undergraduate at Oxford. Becoming a priest in 1884, he officiated at the Pro-Cathedral, Kensington, London, for two

years, became Chamberlain to Pope Leo XIII. and Private Chaplain and Domestic Prelate to Pope Pius XI. He served with distinction in the European War, being mentioned in despatches and receiving the Mons Medal, 2 roses, Victory Medal and General Service Medal. The University of Notre Dame, Indiana, and Marquette University, Wisconsin, conferred upon him their honorary degrees of LL.D. in 1917. While a notable figure in the ecclesiastical world, he became known chiefly to the British and American public as an author under the name of John Ayscough, both as a writer of books and as contributor to magazines and reviews. His later works include *Impressions of America, Pages from the Past* (1922) and *Mariquilla*. Under his real name he wrote *The Life and Letters of Edward Bickersteth, D.D.*; *Citizens All* (1918); and edited *Preachers of the Age* (churchmen) series.

ATTOUN, SIR ROBERT (1570-1638), Scot. poet; held Court offices under James I. and Charles I.; knighted, 1612 wrote poems in Latin and English.

ATTOUN, WILLIAM EDMONSTOUNE (1813-65), Scot. poet; wrote *Lays of the Scottish Cavaliers* (1848); part author of *Bon Gaultier Ballads* (1855), with Sir Theodore Martin, who also assisted him in the translation of *Poems and Ballads of Goethe* (1858); prof. of Rhetoric at Edinburgh Univ. (1845).

AYUNTAMIENTO, Span. town council, presided over by alcalde; also administrative dist. over which council has authority.

AZALEA, genus of plants belonging to order *Ericaceae*, resembling the rhododendrum; native of N. America and S. Europe; has delicately tinted flowers, white to dark red.

AZAZEL (Hebr.).—(1) Name given to scapegoat chosen to bear sins of people into wilderness, from allusion in *Leviticus* 16. (2) Evil spirit ranking next to Satan; Satan's standard-bearer in *Paradise Lost*.

AZEGLIO, MASSIMO TAPARELLI, MARQUIS D' (1798-1866), Ital. statesman, painter, and author; married d. of novelist Alessandro Manzoni, and himself published two historical novels; later entered the political arena, and became premier under Victor Emmanuel II.;

AZERBAIJAN, OR AZERBAIJAN SOCIALIST SOVIET REPUBLIC, a portion of the former Russian province of Trans-Caucasia, consisting chiefly of the provinces of Baku and Yelisavetpol.

It is bounded on the east by the Caspian Sea, on the north by the Caucasus and Daghestan, on the west by Georgia and Armenia, and on the south by Persia. It has a total area of about 40,000 square miles. It lays claim, however, to additional territory which would bring this to about 60,000 square miles. The population is about 4,600,000, of whom about 3,500,000 are Moslems and about 800,000 Armenians. The capital is Baku (q.v.). In 1917 Azerbaijan joined with Georgia and Armenia to form a Federal republic, but Azerbaijan declared its complete independence on May 28, 1918. A Soviet government was formed which was recognized by Great Britain, in January, 1920. This government was overthrown by the Bolsheviks, who declared alliance with Soviet Russia, and a political and economic treaty was signed between Azerbaijan and the Soviet Republic, in 1920. There was, however, a considerable element in the country which opposed this, and patriotic bands continued to fight for independence. A treaty, signed on October 13, 1921, between the government of Azerbaijan and the Turkish Nationalists, placed the control of the former, the newly-created Armenian state of Nakhitchevan. The country is rich in oil, and Baku is one of the most important oil centers in the world. See **MAP RUSSIA**.

AZIMUTH is the angle, measured along the horizon, between point where a vertical plane passing through a given star cuts it and the meridian of the observer.

AZORES, three groups of hilly islands in Atlantic belonging to Portugal, of which they are treated as an integral part (37°-40° N., 25°-31° W.), extend over length of c. 400 m.; of volcanic origin, hilly. Climate is temperate. Azores have frequently suffered from earthquakes. Hot mineral springs occur. Largest isl. is São Miguel (41 by 9½ m.); smallest, Corvo (4½ by 3 m.); area, c. 900 sq. m. Eastern group comprises Santa Maria, São Miguel, Formigas Rocks; central, Terceira, Graciosa, São Jorge, Pico, Fayal; western Flores, Corvo. Azores were known to Carthaginians, Normans, and Arabs; discovered by Portuguese (1440); Span. possession (1580-1640); Flores in the Azores, scene of heroic exploit of Sir Richard Grenville against Span. fleet in *Revenge* (1591); scene of disturbances caused by Dom Minguel of Portugal (1828-33). Azores produce wine, pine-apples, oranges, bananas, grain, pulse, tobacco, sweet potatoes; industries include butter and cheese making, distilling; export above

AZOV

productions, also pork, beef. Best harbor is at Horta, Fayal I. Cap. Angra, in Terceira. Pop. 260,000, mostly Portuguese. See MAP WORLD.

AZOV, SEA OF (46° N., 36° 30' E.), arm of Black Sea, S. of Russia; very shallow; gradually sifting up; valuable fisheries; caviare and isinglass.

AZRAEL, RAPHAEL, one of four archangels of Muhammadan celestial hierarchy; sent by Allah to separate soul from body.

AZPEITIA, town, Guipuzcoa, Spain

AZURITE

(43° 11' N., 2° 10' W.); birthplace of Loyola. Pop. 6,100.

AZTECS, Nahuatlan Ind. tribe which founded the Mexican empire, subsequently conquered by Cortes. Their otherwise high state of civilization was stained by wholesale human sacrifices.

AZURE, blue color, supposed to be derived from name of the stone lapis lazuli; in heraldry is represented by horizontal lines.

AZURITE (*Chessylite*), $2\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$, mineral occurring with malachite in copper-ore deposits.

B

B, the second letter of the anct. and modern Rom. alphabet. It is the exact counterpart of the Gk. 'Beta,' represented in Hebrew and Phœnician by 'Beth.' In the 4th century A. D., B in Gk. came to correspond in power to V, and hence, in the Russian and other European languages derived from mediæval Gk., B does not represent the Rom. letter in position and power.

B, in music. In music B represents the 7th degree of the diatonic scale of C, but in Ger. music H represents the Eng. B, while B represented the Eng. B flat. The musical signs denoting flat and natural are modifications of the letter b, i.e., the sign b, denoting flat, is a b with a slightly pointed loop, and the sign ♮, denoting a natural, is a b with a square loop. These signs are used because B was the first note of the scale to be modified by a semitone.

BAADER, FRANZ XAVER VON (1765-1841), Ger. philosopher and theologian; Prof. of Philosophy at Munich (1826); pub. *Fermenta Cognitionis* (1822-25), in which he opposes the trend of modern philosophy. He was a disciple of Jacob Boehme, and believed that an attempt to realize the divine life should be man's ultimate ambition.

BAAL, a Semitic word meaning 'lord' or 'husband,' and sometimes used in that sense in Hebrew; used more specifically of the God of the Canaanites, corresponding to the Babylonian Bel. He was often worshipped on mountain-tops, and his cult was accompanied by immortal rites. In *II. Kings* 1 Ahaziah wishes to seek information of Baalzebub (Lord of flies), the god of Ezkron. Raisin-cakes were eaten at his sacrificial feasts (*Hosea* 3).

BAALBEK (34° N.; 36° 10' E.), ancient city, Syria, on lower slope of Anti-Libanus; formerly magnificent; has remains of three temples, of which greatest was built by Antoninus Pius; sacked by Saracens in 748, and by Timur in 1400; present village is to E. of ruins; has Brit. mission school.

BABA (Arab., Persian, Turk. 'father'),

title of respect similar to R.C. 'Father' when addressing priests.

BABANANGO, district, Natal, S. Africa.

BABBAGE, CHARLES (1792-1871); Eng. mathematician and mechanician; designed but did not finish calculating machines; author of mathematical works.

BABBITT, IRVING (1865), university professor; he graduated from Harvard in 1889 and studied in Paris, 1891-2. He was instructor Romance languages, Williams College, 1893-4; Professor of French literature, Harvard, 1912. Author: *Literature and the American College*, 1908; *The New Laokoön*, 1910; *The Masters of Modern French Criticism*, 1912; *Rousseau and Romanticism*, 1919; *Editor Taine's "Introduction à l'Histoire de la Littérature Anglaise,"* 1898; *Renan's "Souvenirs d'Enfance,"* etc.

BABBIT'S METAL, a bearing or antifriction alloy containing tin, antimony, and copper.

BABCOCK, SAMUEL - GAVITT (1851), bishop; b. Newport, R. I. He graduated from Episcopal Theological School, Cambridge, Mass., 1891. He was ordained deacon, 1877; priest, 1891; P. E. Church; became assistant pastor Grace Church, Hyde Park, Mass., 1892-1903; archdeacon of New Bedford, 1899-1903, and of Massachusetts, 1903-13; bishop of P. E. Church, April 10, 1913.

BABEL, name given to city of Babylon, somewhere in the neighborhood of which place the descendants of Noah (*Genesis* 11), after the deluge, attempted to build a tower which should reach up to heaven, but God punished the builders with a confusion of tongues; derived from Hebrew, *balbel*, 'to confound.'

BAB-EL-MANDEB (13° N.; 43° 10' Arabia and Africa, forming entrance to E.), strait; (15 miles wide) between Red Sea; means 'Gate of Tears' owing to record of shipwrecks; there is now a lighthouse on Perim in middle of strait.

BABER, 'the tiger,' surname of Zahir

ud-din Muhammad (1483-1530), founder of the Mogul dynasty; s. of Omar Sheik, ruler of Ferghana (Russ. Turkestan), and descended from Timur; was a great soldier, and conquered all northern India.

BABEUF, FRANÇOIS NOEL (1762-97), Fr. agitator and journalist; originally a land surveyor, he became an adherent of the extreme party at the outbreak of the Revolution (1789); was commended by Marat, but opposed the aims of Robespierre during the Terror. He launched a paper called the *Tribune of the People* in which, over the signature of 'Gracchus Babeuf,' he advocated a system of communism by which all property should be distributed with the most strict equality. To further his views, B. associated himself with a plot to overthrow the Directory, which, being discovered, B. was guillotined.

BABIISM, religion of a Muhammadan sect, founded 1844, by Mirza 'Ali Muhammad, which acknowledges Muhammad as a prophet, and the *Koran* as an inspired book, but refuses to accept the finality of either, and denies the doctrine of bodily resurrection.

BABINGTON, ANTHONY (1561-86), Eng. R.C. gentleman (of Derbyshire), who had been page to Mary Queen of Scots at Sheffield, and later became head of a plot to assassinate Elizabeth and place Mary on the throne. The conspiracy was discovered, and B. and the rest of the plotters were hanged at Tyburn. Its discovery also led to Mary's execution.

BABINGTON, CHURCHILL (1821-89), Eng. classical scholar; made his reputation as a translator of the writings of Hyperides from the papyrus discovered at Thebes (1847-56).

BABOON, an African monkey, genus *Cynocephalus*, with more or less dog-like face, and fore and hind limbs of about equal length; more adapted for terrestrial than arboreal existence; include chacma, mandrill, etc.

BABRIUS, Gk. fabulist, of whose life nothing is known. A MS. containing 123 of his fables was discovered in 1842, at St. Laura's Convent, Mount Athos, and is now in Brit. Museum.

BABSON, ROGER WARD (1875), statistician; b. Gloucester, Mass. He graduated from the Massachusetts Institute of Technology in 1898. He was president Babson's Statistical Organizations, head office Wellesley Hills, Mass., and branches in London and various American cities. Lecturer on economics; member of original committee Inter-

national Prosperity Institute and of exec. comm. American Economic Association; fellow Royal Statistical Society (London). Author *Business Barometer*, 1909; *Selected Investments*, 1911; *Bonds and Stocks*, 1913; also of *Future Series*, including *The Future of the Working Classes*, *The Future of the Churches*, *The Future of the Railroads*, *The Future of South America*, etc. Appointed head of division of industry in co-operation with Comm. of Public Information, Feb. 1918. Published U.S. Bulletin, Washington, D. C.

BABU, BABOO, term of 'Mr.' or 'Esquire,' applied to Hindu gentlemen; also a Hindu clerk; applied sometimes disparagingly to an Indian who has been educated in England.

BABUNA PASS, defile in S. Serbia (c. 21° 27' N., 21° 34' E.), where Serbians made last attempt to stem Bulgarian advance and defend Monastir (Nov. 1915); arrival of Bulgarian reinforcements made attempt unsuccessful.

BABUYANES (19° 20' N., 121° 10' E.), volcanic islands, Philippines; produce fruits, cereals. Pop. c. 10,000.

BABY.—At birth a normal baby weighs about 7½ lb. This weight is doubled at six months (15 lb.) and trebled at twelve months (22½ lb.), but babies fed artificially increase in weight less regularly than breastfed babies. An infant is normally put to the breast during the first two or three days of life for five or ten minutes at a time, at intervals of six hours, thus obtaining colostrum, which has a beneficial effect on the digestive system, and stimulating the secretion of milk. During this first month the baby is put to the breast at intervals of two hours during the day and twice during the night, for fifteen minutes at a time; during the second and third months, at intervals of two and a half hours during the day and once during the night; during the fourth and fifth months at intervals of three hours during the day and once during the night, towards the end of the fifth month feeding at night being unnecessary.

BABYLON (Heb. *Babel*, 'gate of the god'), anc. tn., Mesopotamia (32° 35' N., 44° 40' E.), on E. bank of Euphrates, cap. of Babylonian Empire; most important between 19th and 6th cents. B.C.; was ruined by Sennacherib of Assyria, c. 690 B.C., but regained prosperity under Nabopolassar and Nebuchadnezzar; conquered by Cyrus, 539; by Alexander the Great, 331; began to decline under Seleucids, of whose kingdom Seleucia (near by) became cap.

The remains of the Great Babylon show it to have been smaller than described; traces of three walls still to be seen; Ger. excavations, 1899 onwards, have revealed sites of places, etc. Adjoining that of Nebuchadrezzar II. traces of irrigation works probably mark site of 'Hanging Gardens' of Semiramis, who represents fabulous luxury of Babylon; built in terrace form and supported on arches resting upon other arches, they were one of seven wonders of the world. The traditional worldliness, luxury, and vice of Babylon furnished Puritans of 16th and (still more) 17th cents. with an epithet to describe Rome, symbolism of Book of Revelation being transferred to current events; the 'Great Babylon' is a common figure of speech applied to large cities.

BABYLONIA, anc. country of Mesopotamia, lying S. of Assyria; low-lying district; name taken from anc. cap., Babylon. Babylonian civilization probably originated with ancient Sumerians, of whom nothing is known except that they invented cuneiform writing, found in oldest records extant dating to 4th millennium B.C. Some authorities consider Semites to be originators of Babylonian civilization, holding that Sumerian language is priestly form of Semitic language. At all events, Semites are first civilized people of Babylon of whom we have historical knowledge; they migrated from Arabia in very early times, different tribes establishing in different cities, which were for long time engaged in war with each other. Little is known of early kings, many of whom are mentioned in inscriptions. Kings of Lagash were apparently predominant in 5th and 4th millenniums until superseded by Sargon I. of Agade, c. 3800 B.C. Later arose dynasties of Ur (3000 B.C.), Isin (2600 B.C.), Larsa (2500 B.C.), after which Babylon came to front. First Babylonian dynasty was established, c. 2200 B.C., by Canaanite kings, eleven of whom ruled; very little history occurs until the time of the Kassites (flourished from c. 1800 to 1130); Nebuchadrezzar I. extended his dominions to the Mediterranean. After this came several changes of dynasty, Elamites obtaining control for short time. Chaldean immigration began in 10th cent., and sovereignty of Babylon was contested by Chaldaea, Assyria, and Elam, Babylonian natives becoming less able to preserve independence.

Chaldaea attained supremacy in 10th cent., and under Chaldean kings Babylon again became powerful. Wars against Assyria continued, latter becoming important under Tiglath-pileser III. in 8th cent., who established pro-

tection over Nabu-Natstr, king of Babylon, and later had himself proclaimed king (called Pulu in Babylonian canon). Shalmaneser IV. of Assyria also reigned in Babylon as Ululâa; after his death revolution occurred; Sargon II. became king of Assyria, Merodach-baladan II. of Babylon; latter, a Chaldean prince, was defeated by former, and also by his successor, Sennacherib, whose son, Assurnadirsuni, became king of Babylon in 699. Various changes and wars subsequently occurred, and long struggle between Chaldeans and Assyrians ended in victory of latter, who ruled Babylon 688-669 B.C. Assyria declined after death of Assur-bani-apli in 626. New Babylonian kingdom flourished under Nebuchadrezzar 'the great,' but declined after his death in 562. Last king of Babylon, Nabu-na'id, was subdued by Cyrus of Persia in 538; Babylon henceforth held by Persia, till later conquered by Alexander the Great, after whose death the country became of no importance.

Babylonian Law is known to us from a fairly large number of anc. records and archaeological evidence from the very remote past down to about the time of Christ. Even when Babylon had ceased to exist as a state its law survived, and some of it was taken over by Mohammedan codes. But the discovery of the Code of Hammurabi (king of Babylon about 2250 B.C.) gave a much more detailed knowledge of it than was possible before. It shows a highly developed political and social system then in existence. The community was divided into three classes—first, a ruling class, including those of noble and professional rank, an intermediate class whose exact scope and function it is difficult to determine, and the slaves. Commerce was regulated, and a regular financial and banking system had come into being. An elaborate system of water-works kept the country irrigated. The criminal law inflicted many penalties—death by hanging or burning, mutilation on the principle 'Let the punishment fit the crime,' and financial penalties. Before he could be punished a man had to be *proved* guilty. Trade was carried on by caravans which often journeyed far outside Babylon. Marriage had to be accompanied by payment to the bride's father, but the money was generally returned to the bride. The wife was still considered to belong to her own family, and her husband could divorce her if he chose, though he had to relinquish the children. Immorality was punished with death or other penalties.

Religion.—During the period of the

development of the Babylonian and Assyrian religion changes took place, but the primitive belief was that every object in nature housed a spirit which collectively governed the actions of mankind. Thus arose a fetish worship, with its medicine-men, who professed to combat the malevolent spirits who were the cause of disease and sickness. In the course of time these multitudinous spirits were gathered into a great hierarchy, whence arose the gods of the heavens, the earth, and the underworld. Of these deities Ea was lord of the sea; Dav-kina, his consort, the earth-goddess; their children being Tammuz and Istar, both of whom were held in great veneration throughout Babylonia and the whole of Western Asia; there were also Samas, the son-god; Mul-lil, lord of the nether world; his consort, Nin-kigat, and their son Namtar, who spread disease and death. The powers of all these gods, however, eventually became absorbed in the paramount Baal, who was held to be the father and creator of the universe.

BABYLONIAN CAPTIVITY, name given to the deportation of the Jews from Judea to Babylon by Nebuchadrezzar; they were allowed to return to their own country when Cyrus conquered Babylonia (537 B.C.); name also applied to residence of Popes at Avignon, 1309-77.

BACACAY, tn., Luzon, Philippines (13° 18' N., 123° 47' E.); in volcanic district. Pop. 14,000.

BACARRA, tn., Luzon, Philippines (18° 17' N., 120° 35' E.); in fertile district. Pop. c. 15,000.

BACCARAT, gambling game, with cards, of complicated and varying rules, played by from three to eleven persons. It is forbidden in many clubs. The origin of the name is unknown. It has been popular in France for a long period.

BACCARAT (48° 28' N., 6° 43' E.), town, France; manufactures glass. Pop. c. 7000.

BACCHANALIA (Lat.), riotous orgies held at Rome and at other towns in honor of the god Dionysus (Bacchus). At these festivals the grossest debaucheries were committed, which led to their partial suppression throughout Italy (186 B.C.).

BACCHUS. See **DIONYSUS**.

BACCHYLIDES (fl. 467 B.C.), Gk. lyric poet; nephew of Simonides; wrote odes, elegies, and drinking songs.

BACCIOCHI, FELICE PASQUALE (1762-1841), Corsican who served in

Italy under Napoleon, whose eldest sister, Elisa, he m., 1797; cr. Prince of Lucca and Piombino (1805). Their dau., Napoleone Elise (1806-69), m. Count Camerata.

BACCIO D'ANGOLO (1460-1543), Ital. woodcarver, architect, and sculptor; did much carving for Church of Santa Maria Novella and Palazzo Vecchio, Florence; was also architect of the Bartolini Palace, the Villa Borghese, and the campanile of Santo Spirito.

BACH, JOHANN SEBASTIAN (1685-1750), Ger. composer; b. Eisenach, where his f. was court and town musician; member of a family which had produced musicians for several generations; lost his f. at age of ten, and was taken under the care of an elder bro., Johann Christoph, organist at Ohrdruff. Apparently the boy's progress was too rapid for his guardian, who forbade him the use of certain compositions of the earlier masters. The lad, however, managed to obtain secret possession of the volume at night, spent six months in laborious copying by moonlight only to have the work confiscated by Christoph when it was discovered, while the strain put upon Sebastian's eyesight undoubtedly did much to hasten the blindness which overtook him. At the age of fifteen he was thrown upon his own resources by the death of his brother. He went to Lüneburg, and having a fine soprano voice became a member of the choir at St. Michael's School, remaining after his voice had broken as violinist and player upon the harpsichord. When nineteen he became organist at Arnstadt, later moved for a year to Mülhausen, and secured a long engagement as Kapellmeister to the Köthen court. Here he devoted himself to composition, producing some of his greatest works. Eventually he went to Leipzig, where the remainder of his life was spent.

BACHARACH (53° 3' N., 7° 47' E.), town, on Rhine, Germany; wine.

BACHE, FRANCIS EDWARD (1833-58), and **WALTER BACHE** (1842-88), Eng. musicians; were bro's; former composer of operettas and pianoforte pieces; latter, Prof. of Pianoforte at Royal Academy of Music.

BACHELLER, IRVING (1859), auth.; b. Pierpont, N. Y. He graduated from St. Lawrence Univ. in 1882. He contributed extensively to New York press for many years; on editorial staff New York World, 1898-1900. Trustee St. Lawrence Univ. Author: *The Master of Silence*, 1890; *The Hill House of O'Darrow*, 1894; *Eben Holden*, 1900; *D'ri and I*,

1901; *Darrel of the Blessed Isles*, 1903; *Vergilus*, 1904; *Silas Strong*, 1906; *The Hand Made Gentleman*, 1909 *The Master*, 1910; *Keeping up with Lizzie*, 1911; *Charge It*, 1912; *The Turning of Griggsby*, 1913; *Marryera*, 1914; *The Light in the Clearing*, 1917; *Keeping up with William*, 1918; *A Man for the Ages*, 1919.

BACHELOR (supposed to be derived from Low Lat. *baccalaris*, *baccalarus*, tenant of a small farm), term applied to an unmarried person, or person holding an inferior degree or standing—thus knight-b was an inferior of a knight-banneret; an inferior grade of ecclesiastic; the lowest degree of a univ.

BACHELOR'S BUTTONS, term applied to plants of various kinds—(e.g.), double daisies.

BACHIAN (0° 30' S., 127° 30' E.), fertile island, Molucca Sea, Dutch East Indies.

BACILLUS. See **BACTERIOLOGY**.

BACK, SIR GEORGE (1798-1878), Brit. admiral and Arctic explorer, accompanied Franklin on his expeditions (1819-1824); during Ross Search Expedition discovered Great Fish R. (1833).

BACKARGANJ (22° 30' N., 90° 20' E.), district, Dacca, Brit. India: part of Ganges and Brahmaputra delta, and in S. forest tracts, Sunderbunds; fertile, healthy country, intersected by rivers and canals; great rice crops; area, 4,542 sq. miles. Pop. 2,300,000.

BACK BOND, Scot. legal term for a document qualifying an earlier deed.

BACKGAMMON, game of skill, played on a folding board, or table, each half of which is marked off into twelve *feches*, or points, six at each end. It is played by two persons, each player having fifteen draught-like pieces, the movements of which are governed by the casting of dice.

BACKHAUS, WILHELM (1884), Ger. pianist, made a concert tour of the Continent and England (1902-5), and America (1912) as soloist with New York Symphony Orchestra.

BACKNANG (5° 10' N., 105° W.), river, 560 miles, Canada; enters inlet of Arctic Ocean.

BACKUS, TRUMAN JAY (1842-1908), writer and educator; b. Milan, N. Y. He graduated from the University of Rochester, in 1867. He was president Packer Collegiate Institute; formerly Brooklyn Civil Service Commissioner under Mayors Schieren and Wurster; president board of managers of State Care of the Insane; president Head-

masters' Association. Author: *Great English Writers*; *Outlines of English Literature*; Reviser of *Shaw's History of English Literature*.

BACKWELL, EDWARD (d. 1683), Eng. goldsmith, who introduced modern system of banking into Eng.

BACOLOD, tn., N.W. coast Negros I., Philippines (10° 41' N., 122° 57' E.), Once cap. of isl. It is an important coast town, with productive fisheries; captured by Americans (1903). Pop. 12,000.

BACON, ALBERT WILLIAMSON (1841), rear admiral U.S. navy; b. Philadelphia, Jan. 5, 1841. He was educated in public and private schools in Frankfort, Ky., and Philadelphia. He was appointed captain's clerk, U.S.N., 1861; assistant paymaster, 1863; assistant paymaster, 1866; paymaster, 1874; pay inspector, 1898; pay director, 1900; retired Jan. 5, 1903, with rank of rear admiral. With Admiral Farragut's fleet during Civil War; later on North Atlantic Station; was in charge of U.S.N. depots at Rio de Janeiro, Brazil, and Nice, France; served in Navy Dept. and Mare Island Navy Yard.

BACON, ALBION FELLOWS (1865), social reformer; b. Evansville, Ind. He was educated in Evansville High School. He was organizer for three years men's circle of Friendly Visitors, and of Flower Mission for five years; an organizer of Anti-Tuberculosis League Monday Night Club, Working Girls' Association; in 1911, organized Ind. Housing Association; member of District Nurse Circle, Civic Improvement Society; State Federation of Women's Clubs, etc. Chief advocate of State tenement law enacted in 1909; responsible for passage of housing law relating to all unsafe and unsanitary dwellings in State of Ind.. 1917. Member of State Commission on Child Welfare and Social Instruction; chairman State Child Welfare Association. Lectures and writes on Tenement Reform. Author of various books and pamphlets.

BACON, DELIA (1811-59), Amer. authoress; dau. of David B., missionary among the Indians and founder of town of Talmadge, Ohio. She is remembered only by her *Philosophy of the Plays of Shakespeare Unfolded* (1857), in which she sought to prove that Shakespeare's plays were written by Francis Bacon, Spenser, and Raleigh. In the preparation of this work she spent some years in England, during which time she became insane.

BACON, FRANCIS, LORD VERULAM AND VISCOUNT ST. ALBANS (1561-1626), Eng. philosopher, essayist,

and statesman; youngest s. of Sir Nicholas B. and nephew of William Cecil, 'the Great Lord Burghley'; b. London, Jan. 22; ed. privately, and later at Trinity Coll., Cambridge; subsequently entered Gray's Inn (1576), was called to the Bar (1582), and became a bencher of his Inn (1586). While a student at Cambridge he attracted the favorable notice of Queen Elizabeth, who dubbed him 'the Young Lord-Keeper.' He accompanied Sir Amyas Paulet on a mission to France (1577); applied to his powerful uncle for a Court appointment, but was unsuccessful. His success at the Bar, however, was considerable, and he entered the political arena as member for Melcombe Regis (1584), sitting subsequently for Taunton, Liverpool, Middlesex, and Southampton. He obtained from Burghley (1589) the reversion of the clerkship of the Star Chamber (worth £4600 per year), but this did not fall vacant until 1608. In the meantime he attached himself to the Earl of Essex, Burghley's rival at Court, who bestowed many favors upon him. B. commenced his public life with an inordinate belief in himself, and was throughout his life servile to those placed above him, and treacherous to his friends.

With the downfall of Essex, B. had no compunction in endeavoring to secure the Earl's conviction for treason, while at the same time he sought to exonerate himself. With the accession of James I. B. lost no time in bringing his old arts of flattery and obsequiousness to bear upon the new monarch, with the result that he was knighted (1603); became Solicitor-General (1607); Attorney-General (1613); Lord-Keeper (1618); Lord Chancellor, and Baron Verulam (1619), and was cr. Viscount St. Albans (1621). These latter titles were derived from Verulamium, the Latin name of St. Albans, near which his estate lay. B.'s rise to greatness was followed by his immediate downfall, for on March 17, 1621, charges of corruption were laid against him by the Commons. He attempted no defense, merely asking his judges 'to be merciful to a broken reed.' Having been found guilty B. was fined £40,000 (which fine was remitted), was committed to the Tower during the king's pleasure, and was declared incapable of again holding a public office.

B. was now able, for the remainder of his life, to devote his energies entirely to the literary and philosophical writings in which he really achieved greatness, and which constitute his enduring title to fame. B.'s *Advancement of Learning* was pub. 1605; *Wisdom of the Ancients* 1609; *Novum Organum*, 1620; *Henry*

VII. and other works, 1622; *Essays* (complete) and *Apophthegms*, 1625. In a purely literary sense B. is seen at his best in his *Essays*, which combine a high sense of style with much practical wisdom and keen observation of life; and in his *Henry VII.*, which displays much scholarly research, he characterizes Henry with remarkable skill, and gives an attractive and animated account of that momentous reign. The attempts by some writers to father upon B. the plays of Shakespeare need not be seriously considered.

BACON, FRANK (1864-1922); actor, b. Marysville, Calif. He was educated in the public schools of San José, Calif. His first appearance was in San Francisco; part author, with Winchell Smith, of 'Lighnin'', produced at Gaiety Theater New York, August 26, 1919, and which ran continuously for three years and a day. The character of Bill Jones, played by Bacon, won extraordinary praise from the critics, many of them considering it the best American character so far seen on the American stage. Played in *Alabama*, *Puddin' Head Wilson*, *Me and Grant*, *Cinderella Man*, *Fortune Hunter*, etc.

BACON, JOHN (1740-99); Eng. sculptor; patronized by George III.; examples of his work are to be found in St. Paul's Cathedral, Christ Church and Pembroke Colleges, Oxford, Bath Abbey, and Bristol Cathedral.

BACON, JOSEPHINE DODGE DASKAM dau. H. Sawyer and Anne Daskam; (1876), writer; b. Stamford, Conn. She graduated from Smith College in 1898; m. Selden Bacon, July 25, 1903. Author: *Smith College Stories*, 1900; *Sister's Vocation and Other Girls' Stories*, 1900; *The Imp and the Angel*, 1901; *Fables for the Fair*, 1901; *The Madness of Philip*, 1902; *Whom the Gods Destroyed*, 1902; *Middle Aged Love Stories*, 1903; *Poems*, 1903; *Memoirs of a Baby*, 1904; *Her Fiance*, 1904; *The Domestic Adventurers*, 1907; *Ten to Seventeen*, 1908; *An Idyll of All Fools' Day*, 1908; *In the Border Country*, 1909; *Biograph of a Boy*, 1910; *While Caroline Was Growing*, 1911; *Margarita's Soul* (under the name of Ingraham Lovell), 1909; *The Inheritance*, 1912; *The Luck o' Lady Joan*, 1913; *Today's Daughter*, 1914; *Open Market*, 1915.

BACON, LEONARD (1802-81), Amer. Congregationalist; bro. of Delia B.; pastor at Newhaven, Connecticut (1825-81); exercised considerable influence upon Amer. theol., and was regarded as the leading Congregationalist of his time. He was opposed to slavery.

wrote a number of hymns, and pub. *Slavery Discussed* (1846), *Thirteen Historical Discourses, Genesis of the New England Churches*, etc.

BACON, SIR NICHOLAS (1509-79), Lord-Keeper of the Great Seal of Eng.; was the *J.*, by his second wife, of Francis Bacon, Viscount St. Albans; he seems to have possessed moral principles which were wanting in his more famous son; he lived respected and died regretted; founded a free grammar school at Redgrave.

BACON, RAYMOND FOSS (1880), chemist; b. Muncie, Ind. He was instructor of chemistry, DePauw Univ., 1899-1900; professor of chemistry, Vincennes Univ., 1900-1; commercial chemist in Chicago, 1904-5; chemist U.S. Bureau of Science, P.I., 1905-10; assistant chemist, Bureau of Chemistry, Washington, 1910-1911; professor of chemistry, Univ. of Pittsburgh from 1911. Member of National Research Council of Council of National Defense, 1917. Lt. Col. Chem. Service Section, N.A., Dec. 1917; chief Technical Division Chemical Warfare Service, A.E.F., 1918.

BACON, ROBERT (1860-1919), Amer. public official; b. Boston, July 5, 1860; educated at Harvard, where he first formed his friendship with the late President Roosevelt; later entered banking house of Lee, Higginson and Co., of Boston; became member of firm of E. Rollins Morse and Bro., 1883-1894, and from 1894-1903 was a member of J. P. Morgan & Co. It was at this period of his career that he generally received credit for the long series of negotiations which ended in the formation of the International Mercantile Marine. He was also a great aid to President Roosevelt in the coal strike of 1902, in which work he was associated with George W. Perkins; soon afterwards resigned from the firm of J. P. Morgan & Co., the reason given being that of indifferent health. From 1905-9 was assistant-secretary of State; Jan. 27 to March 6, 1909, Sec. of State, succeeding Elihu Root, elected to Senate, became ambassador extraordinary and plenipotentiary to France Dec., 1909 to Jan. 1912. Member Board of Overseers, Harvard University, 1889-1901 and 1902-8; fellow Harvard, Jan. 1912. Member Advisory Board American Defense Society. Manifested strong sympathies with the Entente and went to France in connection with the work of the Harvard surgical unit serving with the British Army and the American Ambulance Hospital in Paris. A strong advocate of preparedness, he spent much

time in work with National Security League, Army League and Navy League; during 1916 strongly criticized Wilson's policies; defeated in his attempt to attain candidacy for the United States Senate against Calder, although supported by Elihu Root and Joseph H. Choate. Commissioned major U.S.R., May 1917; assigned to staff of General Pershing with A.E.F. in France. Has written and edited various books and pamphlets relating chiefly to international subjects. Died May 29, 1919 in New York.

BACON, ROGER (c. 1214-94), an early Eng. philosopher and scientist, author of numerous treatises; b. near Ilchester, Somerset. Educated at Oxford, where he took orders in 1233. Went to Paris to study and returned about 1250, when possibly he joined the Franciscan order. His learning won for him the title of 'Doctor admirabilis.' His brother friars were jealous of his ability, and his research in physics and chemistry caused him to be suspected of dealings in the black arts and gave rise to doubts as to his orthodoxy.

In 1257 his lectures at Oxford were interdicted, and he was imprisoned in Paris. During his confinement he was requested to send to Rome a copy of his work, which the Pope, Clement IV., had been forbidden to read at the time when he was Guy de Foulques, papal legate in England. B. accordingly wrote his *Opus Majus*, which he followed up in 1266 with *Opus Minus* and *Opus Tertium*. It is not known what Clement thought of them, but at any rate B.'s release was effected, and in 1268 he was back in England. Ten years later his works were again condemned as heretical, and his second imprisonment, which lasted fourteen years, was sanctioned by Pope Nicholas III. During this term of imprisonment he wrote many treatises, including *De Retardandis Senectutis Accidentibus*. He was released in 1292, and died about 1294.

BACTERIA. See BACTERIOLOGY.

BACTERIOLOGY, the study of bacteria, a general term including the minute vegetable micro-organisms of the class Schizomycetes (splitting fungi), occurring in the air, water, and soil, as well as in the tissues of living plants and animals and their products. Bacteria may be divided into two classes, those of a simpler and lower type, and those which are somewhat more highly developed. The former are unicellular masses of protoplasm, without definite nuclei and without chlorophyll, which multiply by fission, some having little prolongations of their outer covering (certain authorities consider them rather

protrusions of the protoplasmic cell contents) in the form of cilia or flagella which serve as means of propulsion. This class comprises the *coccus* form, a minute globule, the *bacillus*, a straight rod, and the *vibrio*, *spirillus*, and *spirochoete*, which are curved or spiral rods, some of which must be included among the higher types, as they really consist of several cells united end to end. In the process of reproduction the cell becomes more elongated, a septum forms longitudinally up the middle, and the cell splits along the septum, forming two cells which become exactly like the parent cell. This process may go on indefinitely, so that enormous numbers of bacteria may develop in a short time; and when developed in a liquid they become glued together by their swollen cell-walls, and form a film on the surface or a clump floating in the liquid, called a *zoogloea*.

The second class comprises filaments composed of cells which remain united end to end after division, the structure of each element being the same as in the lower types, and also filaments in which some of the cells form *spores* for the purpose of the reproduction of the species. A spore commences by the appearance of a granule round which the protoplasm in the cell gathers, a fine membrane forming and enveloping the mass. This is very resistant and can withstand great extremes of temperatures and under suitable conditions it swells and develops into a cell like that from which it was originally formed.

The growth of bacteria depends on (a) the supply of nourishment, (b) the presence of moisture, (c) the presence of certain gases, (d) the temperature, and (e) light.

Most bacteria require organic matter as food, some requiring protein or carbohydrates, and all requiring nitrogen in some form or other, but a certain number can exist on inorganic food; while inorganic salts (phosphates, chlorides, etc.) are necessary for the life of all.

Moisture is necessary for the existence of all bacteria, although a number of species, particularly in the spore form, are able to live without it for some time.

Oxygen is a very important factor in the life of bacteria, which may be divided into those which require oxygen for existence (*aerobes*), those which cannot exist in the presence of oxygen (*anaerobes*), and those which can live either in the presence or absence of oxygen (*facultative anaerobes*). Carbon dioxide also prevents the growth of anaerobes to a certain extent.

There is a particular temperature, called the optimum temperature, at which each species of bacteria grows best,

that for the bacteria commonly existing in the tissues of animals being between 36° and 38° C.; while the lowest temperature at which growth is ordinarily possible is 10° to 12° C., and the highest 43° to 45° C. Certain bacteria, called *thermophilic* bacteria, have been found—(e.g.), in putrefying animal excretions—which grow at a temperature as high as 70° C.

Sunlight is found to kill even extremely resistant bacteria after a very short time, the time required depending on the density of the medium in which the bacteria are; and it has been found by experiment that the green, violet, and ultra-violet rays of the spectrum are the most bactericidal.

Benefits of Bacteria.—It is erroneous to imagine that all bacteria are harmful; the greater number of them are harmless, and a large number are actually advantageous to man, in agriculture, certain fermentation processes, and other spheres of industry. There are species of bacteria in all cultivated soils which are able to form organic matter from inorganic sources by, for instance, obtaining carbon from carbon dioxide and nitrogen from ammonia, others combining nitrogen with other elements so as to compose substances which plants can absorb. On the roots of leguminous plants (beans, peas, etc.), there are little nodules containing great numbers of bacteria which bring the nitrogen of the air into combination with the soil, and such plants are not only able to live in poor, unmaturing soils, but they actually enrich the soil they grow in. For this reason such plants are or should be included in all rotations of crops. The bacterial nodules are nominally only found on the roots of leguminous plants, but Prof. Bottomley, of King's Coll., London, has recently succeeded in producing them in other plants by a special method of infection.

Milk usually contains numbers of bacteria (e.g., *tubercle bacillus*) which are harmful to man, for which reason the milk should be sterilized before it is used as a food; but, in addition, it often contains bacteria which are not only harmful but impart desirable flavors to milk products—(e.g.), butter and cheese—a fact which is now being made use of by makers of dairy produce, who cultivate pure cultures of such bacteria and treat butter and cheese with them.

The preparation of tobacco and indigo and the process of tanning are other instances of the value of bacteria to man, for in the fermentations in these and similar processes bacteria play an important part.

Bacteria and Disease.—It is, however, to the effects produced by pathogenic

bacteria in man, and to the means of resisting and overcoming these effects, that most attention has been paid. As early as the 17th cent. Van Leeuwenhoek was able to describe bacteria with the aid of the primitive microscope. Müller divided them into two classes in 1773, while in 1838 Ehrenberg proposed quite an elaborate classification. Cohn, however, laid the foundation of the modern science by his researches and discoveries in 1853-75, which were developed by Pasteur, who first showed that disease could be caused by bacteria, and by Koch, by whom most of the modern methods of bacteriological study were instituted. Koch obtained a pure culture of the anthrax bacillus in 1876, and from that time to the present day the knowledge of the bacteria causing specific diseases, of the effects of the bacteria on the tissues, and of the best methods of resisting and neutralizing these effects, has gradually become more exact and complete. Before a bacterium can be universally regarded as the cause of a particular disease, it must be found in the affected tissues (by the use of the microscope), it must be obtained in a pure culture (i.e., quite separate from other organisms), and the disease must be reproduced in an animal by inoculation of it with a pure culture of the bacteria. For microscopic examination lenses of very high power must be employed and the bacteria are detected by staining them in fine sections of the tissues by special and sometimes complicated methods, usually with solutions of aniline dyes. In growing particular bacteria outside the tissues separate from other species meat extracts with gelatine or agar (a gelatinous substance obtained from certain seaweeds) and peptones (products of protein) are commonly used as nutritive culture media, while coagulated blood serum, milk, slices of potato, glucose, and other sugars with gelatine and other substances, are all frequently employed. To ascertain the effect of bacteria on animal tissues inoculations are made usually on rabbits, guinea-pigs, or mice. The effects produced in animal tissues by bacteria are due to the poisons or toxins formed by them, but little is yet known regarding the precise manner of the formation and the chemical composition of these toxins. The tissue changes are partly due to disturbances in the living cells caused by the toxins, and partly due to the reaction of the tissues against the invasion. The cells may degenerate or die, there may be acute inflammation or suppuration, hæmorrhages, emigration of white corpuscles, exudation of fluid, increased growth of connective tissue, and fatty,

hyaline, or waxy degenerations of cells.

Natural Immunity.—The actual, results of the invasion of the body by bacteria vary under different circumstances, depending on the virulence of the organisms, on the local resistance of the part infected, and on the general susceptibility of the individual. Animals may be naturally immune to diseases caused by different bacteria, or they may acquire immunity by successfully undergoing an attack of a particular disease, or through one or other of the methods of inoculation. Natural immunity is due to the power of the animal to destroy the bacteria which invade its tissues, either by the agency of the white blood corpuscles, which are strong enough to overcome the bacteria and engulf them, or through certain substances in the blood serum which are able to kill the bacteria. The power of the white corpuscles to overcome the bacteria is greatly assisted by substances in the blood serum called *opsonins*, which become attached to the bacteria and cause them to be more easily taken within the white corpuscles; and the *opsonic index* is the ratio between the number of bacteria taken up by the white corpuscles in the normal blood of an animal and the number contained within the white corpuscles in the blood of an infected animal of the same species.

Artificial Immunity.—This may be considered under two heads, *active* and *passive*. Active immunity is produced by injecting into an animal non-lethal doses of the living organisms, with their virulence attenuated by various abnormal methods of growing them, or simply in small, non-lethal quantities, or by injecting non-lethal doses of the dead bacteria or of the filtered toxins produced by them in cultures. This gradually produces a resistance to the effects of the bacteria in the animal subjected to the treatment, by the production of more and more resistant substances in the blood. Passive immunity is produced by injecting into an animal the blood serum of another animal which has been rendered immune by the methods described in regard to active immunity, thus carrying to the second animal the resistant substances formed in the blood of the first. The anti-toxins, or substances which counteract the bacterial toxins, are believed to be substances which are normally present in the blood, but under the stimulation of the toxins they are produced in increased quantity, and they act directly by combining with the toxins and neutralizing them.

BACUP (53° 42' N., 2° 12' W.), market town, on Irwell, Lancashire, England;

cotton spinning. Pop. 22,300.

BADAJOZ.—(1) (38° 59' N., 6° 56' W.), frontier province, western Spain undulating surface; metals, pork; area, 8451 sq. miles. Pop. 1910, 561,900. (2) (38° 53' N., 6° 48' W.), town, on Guadiana, Spain, strong fortress; old cathedral ruined Moorish castle; surrendered to Soult, 1811; retaken by Wellington, 1812; hats, pottery. Pop. 33,200.

BADAKSHAN (37° N., 70° 30' E.), territory, part of Afghan Turkestan between Hindu-Kush and Oxus; watered by B. river; capital, Faizabad; produces gold, silver, iron, copper, lead, rubies, emeralds, lapis lazuli, etc.; conquered in turn by Chinese, Sultans of India, Afghans, Uzbeks; whole conquered by Afghans, 1859. Wakhan is dependency, S. of Panj R. People are of Arvan race. Area, 8500 sq. miles. Pop. c. 100,000.

BADALONIA (41° 25' N., 2° 12' E.), port, Spain; manufactures sugar, glass. Pop. 19,240.

BADBY, JOHN (d. 1410), Eng. Lollard martyr; burned at Smithfield for repudiating the doctrine of transubstantiation.

BADDELEY, ROBERT (d. 1794), Eng. actor; played chiefly at Drury Lane and Haymarket theaters, where he made a great reputation in low comedy, and was the original Moses in the *School for Scandal*. He bequeathed £3 annually to provide a cake and wine at Drury Lane on Twelfth Night, which custom is still observed. His wife, Sophia B. (1745-86), an actress and singer, was noted for her beauty and loose conduct.

BADEN—(1) Republic and component state of Germany, between Württemberg and the Rhine. Of surface about five-sixths along the E. is hilly. Odenwald is in N. Schwarzwald or Black Forest in S., and remainder in W. is part of Rhine valley; extreme S.E. drained by Danube; Rest lies in Rhine basin, tribs. being Main, Neckar, Murg, Kinzig. Temp. and rainfall vary considerably; mean temp. for Heidelberg and Mannheim, 61° F.; rainfall ranges from about 40 in. in N. to nearly 80 in Schwarzwald.

Resources.—Rhine dist. produces grain tobacco, hemp, rape, chicory, hops; vines on hills, forest of pine, oak, beech, birch, ash in Schwarzwald; several districts noted for wine. Minerals include limestone, gypsum, salt, soda; many mineral springs. Manufactures cottons, ribbons, paper, tobacco, beer, clocks, musical instruments, hats, chemicals, etc., all exported. Area, 5,823 sq. m.; pop. 2,229,100. See MAP GERMANY.

History.—The former grand-duchy

dates only from the time of Napoleon I. In 12th cent. member of house of Zähringen (from Zähringen in the Breisgau). Hermann I., margrave of Verona, inherited Baden, and from 1112 his successors called themselves margraves of Baden; sometimes united under one tenant, but early divided into the overmargravate of Baden-Baden; and lower of Baden-Durlach separate 1527-1771. Baden-Baden remained Catholic at Reformation, while Baden-Durlach became Protestant; united (1771) under Karl Friedrich of Baden-Durlach. In 1803 margravate was raised to electorate, and in 1806 Karl Friedrich, by joining Confederation of Rhine, became sovereign prince and assumed title grand-duke; his grandson Karl married Stéphanie de Beauharnais. In 1815 Baden entered Ger. Confederation and received liberal constitution (1818); reforming grand-duke Leopold (1830-52), the Volksfreund, introduced Prussian Zollverein (1832); forced to fly by armed risings of 1848-9; reinstated in 1849 by Prussian aid. Religious differences, still unsettled, broke out under his son; Concordat made (1859) with Rome roused strong opposition. Baden supported Austria against Prussia (1850-66), but then left Ger. Confederation and joined Prussia, whom she supported against France in 1870-1. Frederick II.; last grand-duke, abdicated Nov. 1918, provisionals government thereupon declared a republic.

Constitution.—Free State of Baden is a republic; no privileges for birth or caste; equal rights for men and women; universal suffrage; proportional representation, the initiative and referendum adopted; six members, elected by legislature, constitute the cabinet; no provision made for a president; religious instruction in schools compulsory, but there is no State Church.

(2) Or Baden-Baden, cap. of above republic (48° 16' N., 8° 14' E.); beautifully situated health resort; mineral springs and baths; prior to Great War 75,000 visitors annually; known to Romans; wood carving. Pop. 22,000. (3) Tn., Switzerland (47° 28' N., 8° 18' E.); famous for hot mineral springs since Roman times; seat of Swiss federal council for three centuries. Pop. 8,300. (4) Or Baden bei Wien, spa and tn., Lower Austria (48° 2' N., 16° 14' E.); warm sulphur springs. Pop. 14,000.

BADENI, CASIMIR FELIX, COUNT (1846), Austrian statesman; governor of Galicia (1888), premier (1895-7); his attempt to put the Czech and Ger. languages on the same level aroused the bitterest opposition and led to his resignation.

BADENOCH (56° 55' N., 4° 10' W.), mountainous district, S.E. Inverness-shire, Scotland; deer forests.

BADEN-POWELL, SIR ROBERT STEPHENSON (1857), Brit. general; held Mafeking until its relief (1900), and assisted in capture of Pretoria; established Boy Scouts (1908); has written several books, chiefly on scouting. It aims at giving knowledge of art of war and at development of hardihood and manliness in future citizens. A similar association of Girl Scouts has been formed. See *Boy Scouts*.

BADENWEILER (47° 49' N., 7° 24' E.), village, Baden, Germany; mineral springs.

BADGE (M.E. *Bage*), emblem adopted by different families; originated at same time as armorial bearings, to which it does not belong; early examples, Fr. *fleur-de-lys* (XII. cent.) of royal family.

BADGER (*Meles*), Musteline Carnivora of N. hemisphere, of nocturnal, solitary habits, living in burrows; badger-drawing was an old Brit. sport, hence *badgering*, term for worrying or teasing.

BADGER, CHARLES JOHNSTON (1853), naval officer; b. Rockville, Md. He was appointed to the U.S. Naval Academy at-large by President Grant, 1869, graduating in 1873; promoted captain, 1907; superintendent U.S. Naval Academy, 1907-9; commanded battleship *Kansas*, Atlantic Fleet, 1909-11; rear admiral, 1911. Commanded 2nd Division U.S. Atlantic Fleet, Flagship *Louisiana*, 1911; Commander-in-chief U.S. Atlantic Fleet, Flagship *Wyoming*, 1913-14; member of General Board since 1914. Retired by operation of law, 1915, but continues to do active work as member of General Board.

BADHAM, CHARLES (1813-84), Eng. scholar; b. Ludlow; ed. Oxford; subsequently schoolmaster at Louth and Birmingham, from 1866 until his death was prof. of Logic and Classics in Sydney Univ.; was noted for his ripe scholarship, and editions of *Euripides*, *Plato*, and other classic authors.

BADINGEUX (Fr.), nickname of supporters of Napoleon III., who was styled *Badinguet* after his flight from Ham in clothes of mason of that name.

BAD LANDS, waste tracts of deeply eroded plateaus, forming valleys, columns, and peaks found in Black Hills region of Missouri basin, which early French visitors called *mauvaises terres*.

BADMINTON, a game, named after the seat of the Duke of Beaufort in

Gloucestershire, somewhat resembling tennis, played with racquets and a shuttle-cock by two players, one on each side, or four players, two on each side, on a court 44 ft. long and 20 ft. broad, with a net stretched transversely across the middle, 30 in. deep, the top of the net being 5 ft. from the ground at the center.

BADNUR (21° 52' N., 77° 57' E.), town, Betul, Central Provinces, India.

BADOGLIO, PIETRO (1871), Ital. general; at the outbreak of war between Italy and Austria (May 1915) was appointed chief of staff to General Capello, commander of the army of Gorizia, and in this capacity helped to prepare plans for the battle which resulted in the capture of town (Aug 1916). Promoted brigadier, and shortly thereafter lieutenant-general, he commanded a corps at the battle of the Bainsizza plateau. After great retreat of Nov. 1917, he became sub-chief of the general staff, a post he held until hostilities ceased. In Aug. 1919, when d'Annunzio anticipated the decision of the Peace Conference and seized Fiume, Badoglio was sent by Ital. Government to try to secure a peaceful settlement.

BADULLA (7° N., 81° 5' E.), town, Uva, S.E. of Kandy, Ceylon.

BAEDEKER, KARL (1801-59), Ger. publisher, issued in 1839 the first of an admirable series of guide-books printed in German, French and English, which now deal with every country of importance to travellers. The inception of guide-books was due to John Murray, to whom Baedeker expressed his indebtedness.

BAEKELAND, LEO HENDRICK (1863), chemist; b. Ghent, Belgium. He was educated in Belgian universities; held various professional posts in Belgium, 1882-89; came to America 1889; founded in 1893; and directed until 1899, Nepera Chemical Co., which manufactured photographic papers of his invention; He sold this to the Eastman Kodak Co., in 1899 and has since done chemical research work. Consulting chemist for Hooker Electro-Chemical Co., Niagara Falls, N. Y., 1905; president General Bakelite Co., manufacturing Bakelite and chemical synthesis from carbolic acid and formaldehyde, replacing hard rubber and amber. Member numerous boards and committees and winner of many medals for scientific work.

BAEL FRUIT (*Aegle marmelos*), or Bengal Quince, tree, with aromatic fruit, of W. Africa and tropical Asia; cultivated in India.

BAER, KARL ERNST VON (1792-1876), Russian zoologist and embryologist, founder of science of comparative embryology. By his discoveries he exploded the 'animalculist theory.'

BAER, WILLIAM JACOB (1860), Amer. artist; revised miniature-painting in America, and was first Pres. of the Society of M.P.; New York.

BAEZA (37° 57' N., 3° 27' W.), town, Jaen, Spain; important Moorish city; leather. Pop. 14,000.

BAFFIN BAY (72° 30' N., 66° W.), large gulf, W. of Greenland; first explored by Baffin, 1616; whales, seals.

BAFFIN LAND (70° N., 70° W.), extensive island, W. of B. Bay; no trees.

BAFFIN, WILLIAM (1584-1622), Eng. navigator; b. London, of lowly parentage; served as pilot in a Greenland voyage, 1612; spent two years in Spitzbergen whale-fishing, 1613-14; went as pilot of the *Discovery* in search of the N.W. Passage for the Muscovy Company, 1615, when he made a survey of Hudson's Strait. In the following year he discovered the bay which has since borne his name. He was killed at the siege of Ormuz, Jan. 23, 1622, when the English were allied with the Persians against Portuguese.

BAGALKOT, tn., Bombay, India (16° 12' N., 75° 45' E.); silk and cotton. Pop. 20,000.

BAGAMOYO (6° 31' S., 38° 50' E.), seaport town, Ger. E. Africa; commercial center. Pop. 11,000.

BAGASSE (Fr.) remains after pressing sugar-cane; forms fuel.

BAGATELLE, originally meaning (Fr.) a trifle; a game resembling billiards, played on a table about 7 ft. by 1½ ft. or slightly larger, with slate floor covered with cloth, and cushioned at the sides. Nine small ivory balls are used, the object being to put them into nine numbered holes at one end of the table by the aid of a cue.

BAGDAD. (1) Vilayet of Mesopotamia, in basin of lower Euphrates and Tigris; flat alluvial plain, formerly one of the granaries of the world, now steppe land; yield dates, bitumen, naphtha, and petroleum, exports wool, carpets, mohair, skins, etc.; bituminous coal plentiful. Area, 54,450 sq. m.; pop. 1,360,300 (Mohammedans predominate).

(2) City, cap. of above (33° 21' N. 44° 27' E.), on Tigris, 340 m. as aeroplane flies from mouth of the Shatt-el-Arab, and on Bagdad Railway; stands in flat treeless plain. Within circle of

35 m. radius are ruins of Babylon, Seleucia, Ctesiphon, and Kerbela; important caravan center and emporium. Silk and other textiles, copper utensils, and leather goods are manufactured; exports are similar to those of the vilayet; built on both banks of river (300 yds. wide, crossed by bridge of boats); modern city (eastern section) includes governor's palace, the European consulates, the chief bazaars, etc.; western section is the principal Pers. quarter; low brick walls and mud buildings; city encircled and interspersed with groves and date palms; cosmopolitan pop. Bagdad reached height of its glory under Haroun-al-Raschid (9th cent.); greatness disappeared after Mongol raid (1257-8); fell to the Turks in 1638. Entered by British, March 11, 1917. At Peace Conference came definitely within sphere of Brit. influence. Became the capital of the Kingdom of Irak, created in 1921. See **IRAK**, **KINGDOM OF** Pop. c. 250,000 (Mohammedans, 80,000; Jews, 50,000; Christians, 10,000).

BAGDAD RAILWAY. First concession made in 1888 to group of Brit. and Ger. capitalists for extension of the Constantinople-Ismid Ry. to Angora; British subsequently bought out, and practically a Ger. concern; Germany's motive ostensibly commercial, but really political; project spoken of in Germany as B.B.B. (Berlin, Byzantium, and Bagdad Ru.). At close of 1899 the Imperial Ottoman Bagdad Ry. Co. obtained concession for construction of line from Konia, eastern terminus of the Anatolian system, to Basra and Persian Gulf; concession for 99 years, entire line to be completed in eight years. Convention signed March 5, 1903, giving, in effect, complete control to the Ger. Government. After a Brit. protest, fresh arrangements made whereby Ger. financial group controlled 40 per cent of the capital, French group 20 per cent. Attempts to secure Brit. participation in the scheme failed. Intention was that the terminus should be Koweit, on Persian Gulf, but Britain insisted that there should be no extension beyond Basra without her consent. An agreement—terms of which have not been disclosed—was initiated by Lord Grey and Count Lichnowsky in June 1914, but had not been ratified when war broke out. At that time line had been carried as far as Karapunar, W. of the Taurus range. The 20 m. stage through the mts. was not completed till the close of 1916. On other side of the range line had been completed from Dorak to Adana, and continued to Namurie, where a second break to 6 m. intervened through the Amanus

range. This section was completed and opened during 1915. Thereafter line ran from Radjun to Muslimie, thence to Jerablus and Ras-el-Ain, from which place to Nisibin track was completed by Brit. prisoners, and carried towards Mosul. There was still (1919) a wide gap between Nisibin and Mosul, and also between Mosul and Tekrit, to which point beyond the British continued the Bagdad-Samara section in 1918. Work was begun at the E. end of the railways in 1912, when the Bagdad-El Helif section was commenced. It had been carried as far as Samara, 75 m., just before the outbreak of the war. The Bagdad Ry. was of considerable value to the Turks in their campaigns, though road transport was necessary to negotiate the gap in the Taurus Mts. down to 1916. Thereafter they had a through ry. between the railroad opposite Constantinople to N. Mesopotamia. Bagdad station was captured by the British on March 11, 1917, and the completed length to Samara in the following month. The whole, including the Taurus tunnel system, fell into Brit. hands at the armistice with Turkey.

BAGE (31° 30' S., 54° 15' W.), town, Rio Grande do Sul, Brazil.

BAGEHOT, WALTER (1826 - 77), Eng. economist; s. of a banker; b. Langport, Somerset; ed. Univ. Coll. London; called to Bar (1852); joined his f. in the banking business of Stuckey & Co.; editor of *The Economist* from 1860 until his death. His notable writings include *The English Constitution*, 1867; *Physics and Politics*, 1869; *Lombard Street*, 1873; *Literary Studies*, 1879; *Economic Studies*, 1880; the two latter being pub. after his death. B. undoubtedly exercised considerable influence upon the thought of his time, and several of his works were trans. into a number of foreign languages.

BAGELEN, residency of Central Java, E. Indies (7° 40' S., 109° 40' E.), on S. coast; flat fertile lands backed by elevated forested region. Area, 1,323 sq. m.; pop. 1,500,000.

BAGGESEN, JENS IMMANUEL (1764-1826), Dan. poet; b. Korsør, of very poor parents; was self-educated until he managed to gain entrance to Copenhagen Univ. in 1782. His *Comic Tales* (in verse), pub. when he was 21, met with immediate success. He wrote with equal fluency in both Danish and German; his other works include *Alpenlied*, *The Labyrinth*, and *Parthenais*. His later years were clouded with poverty and madness.

BAGHAL (31° 13' N., 77° 1' E.), small hill state, Punjab, India.

BAGHELKHAND, tract of country in extreme E. of Central India Agency (24° 20' N., 82° E.); W. part elevated plain; E. part hilly; traversed by E. Indian and Bengal-Nagpur Rys. Agency of same names contains twelve states; largest Rewa (13,000 sq. m.). Area, 14,323 sq. m.; pop. 1,770,000.

BAGHERIA (38° 4' N., 13° 31' E.), town, Palermo, Sicily. Pop. 11,500.

BAGIRMI (11° N., 17° E.), state, Central Africa, in valley of river Shari, capital, Chekna; subject to Wadal; contains fertile level plateau; pop. principally negroes; rice, cotton, pastoral Fula and Arabs rear cattle.

BAGNERES - DE - BIGORRE (43° 6' N., 0° 7' E.), watering-place, Hautes Pyrénées, France; sulphur springs, marble.

BAGNERES - DE - LUNCHON (42° 46' N., 0° 35' E.), watering-place, Garonne, Pyrenees, France; sulphurous thermal springs. Pop. 7000.

BAGNES (Fr. plur., from Ital. *bagno*, first applied to bath in palace at Constantinople, afterwards to prison probably adjoining), Fr. prisons which in 1748 replaced the galleys; abolished 1852 by Napoleon III.

BAGNI (43° 48' N., 10° 24' E.), town, Tuscany, Italy. Lucca, Italy; mineral springs. Pop. 13,685.

BAGNO (43° 32' N., 10° 37' E.), town, Pisa, Italy; hot mineral springs. Pop. 20,899.

BAGNO A RIPOLI (43° 46' N., 11° 18' E.), town, Florence, Italy. Pop. 15,936.

BAGNO IN ROMAGNA (43° 50' N., 11° 57' E.), town, Florence, Italy; thermal springs. Pop. 9601.

BAGOT, RICHARD (1860-1922), Eng. novelist; lived in much in Italy, where he wrote novels of Ital. life and article for Brit. and Ital. reviews. Most recent works: *The Passport*, 1905; *Temptation*, 1907; *Anthony Cuthbert*, 1908; *The House of Serravalle*, 1910; *My Italian Year*, 1911; *The Italians of Today*, 1912; (new ed. 1915).

BAGPIPE, wind instrument, which has been known from a very early period throughout Europe and Asia; was common in Germany and England as early as the XV. cent.; is referred to by Chaucer, Spenser, and Shakespeare; and is still used in Italy, in Southern France, and in Great Britain (Ireland, Scotland, and Northumberland). The Highland b., which is now the most familiar, consists of an airtight leathern

bag, a wind-tube for blowing, three wooden pipes called *drones*, and the *chanter*, a pipe with notes, which produces the melody, the compass consisting of nine notes only. In playing, the *drones* point over the left shoulder, the *bag* is held under the left arm, the blow-pipe is taken between the lips, and the fingers manipulate the notes of the *chanter*. Occasional 'flourishing' or ornamental notes introduced by a player are known as *warblers*. The Irish b., with a much more elaborate *chanter*, is a very sweet-sounding instrument, but is now rarely met with.

BAGRATIDES, Armenian dynasty who ruled Armenia from 885 till overthrow by Turks. XI. cent., and continued in Lesser Armenia till 1375 and in Imeritia, Georgia, till 1810.

BAGRATION, PETER, PRINCE (1765-1812), brilliant Russ. general.

BAHADUR SHAH II., last Mogul emperor of Hindustan (1837-57).

BAHAIS, influential Muhammadan sect in Persia; disciples of Bahá'ullah (d. 1892), who broke away from Bábism (q.v.). The Bible, Koran, and their own books they regard as equally inspired. Buddha, Zoroaster, Christ, Muhammad, and Bahá'ullah were all messengers and manifestations of God. Propagandist work is being actively carried on in Britain and America.

BAHAMAS, OR LUCAYOS, chain of coral islands, W. Indies, (20° 55'-27° 25' N., 70° 30'-79° 20' W.); belong to Britain; include 29 islands and 660 islets, about 20 being inhabited. Rock is porous, retaining moisture, hence soil fertile. Bahamas produce maize, cotton, sisal hemp, pineapples, oranges, lemons, olives, tamarinds, etc.; sponges found in surrounding seas; import textiles, earthenware, glass, foods, etc.; principal exports, sponges, fruits, fibre; administered by governor, executive, and legislative councils and representative assembly; government system of education. Islands were first land sighted by Columbus on his voyage of discovery; have belonged without interruption to Britain since 1783. Largest are Andros, Great Abaco, Great Bahama, and Great Inagua I. Cap. Nassau, New Providence. Area, c. 4,400 sq. m.; pop. c. 56,000. See MAP WEST INDIES.

BAHAWALPUR, native state, Punjab, India (29° 24' N., 71° 47' E.); level and partly desert; silks, chintzes. Cap. Bahawalpur. Pop. 18,000. Area of state, 15,000 sq. m. Pop. 800,000.

BAHIA (12° 56' S., 38° 27' W.), state of Brazil, bordering Atlantic; traversed

N. and S. by mountain range; principal river, São Francisco; productive soil; diamonds, gold; area, 216,000 sq. miles. Pop. 3,000,000.

BAHIA, OR SÃO SALVADOR (12° 56' S., 38° 27' W.), seaport, capital B. state; one of the best harbors east S. America; oldest Brazilian city, founded 1510; seat of R.C. abp. Pop. 350,000.

BAHIA BLANCA (39° 25' S., 61° 28' W.), city and port, Buenos Aires, Argentine Republic; good harbor. Pop. c. 72,000.

BAHR, Arabic geographical term signifying lake or river (e.g., Bahr-el-Yemen, Red Sea).

BAHRAICH, BHARAICH (27° 35' N., 81° 38' E.), town and district, United Provinces, India; tomb of Mas'ud, warrior and Mussulman saint, visited by pilgrims. Pop. 29,000.

BAHRĀM, name of five Persian kings of Sassanid dynasty. Bahrām V. (420-39), the 'Wild Ass,' is celebrated in Persian lit. as warrior and hunter.

BAHREIN ISLANDS (26° N., 50° 30' E.), group of islands, Persian Gulf, near Arabian coast, governed by Sheikh, under Brit. protection; principal island, B.; capital, Manamah; pearl fishing center; dates. Pop. c. 110,000.

BAHR - EL - ABIAD, OR WHITE NILE. See NILE.

BAHR - EL - AZREK, OR BLUE NILE. See NILE.

BAHR-EL-GHAZAL (9° N., 28° E.); river, Sudan; rises in Belg. Congo and, flowing to N.E. through marshy district, unites with White Nile near Sobat; has several feeders, including Bahr-el-Homr, Lol, Jur, Tonj; sometimes obstructed by sudd. Another river of same name flows from Lake Chad to Bodele region, where it ends in swampy country.

BAILE (40° 48' N., 14° 4' E.); town; Campania, Italy, W. of Naples; favorite watering-place of ancient Romans; famous for its warm mineral springs; remains of villas and baths; in B. Triumvirate was formed by Caesar, Pompey, and Cassius, 60 B.C.

BAIBURT (40° 14' N., 40° 4' E.); town, on Ohuruk, Asiatic Turkey; carpets. Pop. c. 7,000.

BAIKAL (54° N., 108° 30' E.), lake; E. Siberia, surrounded by mountains rising to height of 4500 to 5500 ft. above sea-level; length, 370 miles, breadth, 50; surface, about 1380 ft. above sea-level; average depth, c. 900 ft.; frozen,

Dec. to May; crossed by steamers in connection with Siberian railway; salmon, sturgeon, and seal fisheries in N. end; fresh water; receives many streams.

BAIKIE, WILLIAM BALFOUR (1824-64), Brit. traveler, scientist, and author; surgeon and naturalist to Niger expedition, 1854; opened up Niger for England and pub. books on native languages.

BAIL, the setting free of an arrested person who procures surety, or b., on the part of one or more persons who are responsible for his or her reappearance to answer a charge at a fixed time and place. The power of admitting to b. is, in ordinary cases, at the direction of the judge.

BAILEY, the whole of the other buildings and courts of a castle as distinguished from the keep.

BAILEY, CAROLYN SHERWIN, (1877), writer; b. Hoosick Falls, N.Y. She graduated from Teachers' College (Columbia), 1896. Author: *Daily Program of Gift and Occupation Work* (1904); *The Peter Newell Mother Goose* (1905); *For the Children's Hour* (1906); *The Jingle Primer* (1906); *Firelight Stories* (1907); *Stories and Rhymes for a Child* (1909); *For the Story Teller* (1910); *Boys' Make-at-Home Things* (1912); *Songs and Happiness* (1913); *Every Child's Folk Songs and Games* (1914); *Montessori Children* (1914); *Tell Me Another Story* (1918); *What to do for Uncle Sam* (1919); *Broad Stripes and Bright Stars* (1919), etc. Frequent contributor to magazines.

BAILEY, EDGAR HENRY SUMMERFIELD (1848), chemist; b. Middlefield, Conn. He was educated Yale, Strasbourg, Leipzig. Instructor of chemistry, Yale, 1873-4, Lehigh Univ. 1874-83; professor of chemistry and metallurgy since 1883, director chemical laboratory since 1900 University of Kansas. Chemist, Kansas State Board of Agriculture since 1885, State Board of Health since 1899. Member of various societies. Author: (with H. P. Cady) *Laboratory Guide to Study of Qualitative Analysis* (1901); *Sanitary and Applied Chemistry* (1906); *The Source, Chemistry and Use of Food Products* (1914). Contributed various scientific and chemical journals.

BAILEY, GAMALIEL (1807-59), Amer. journalist; was a strong abolitionist; became editor of the *National Era* (Washington, D.C.), in which Mrs. Stowe's *Uncle Tom's Cabin* first appeared (1851-52).

BAILEY, GILBERT ELLIS (1852),

geologist; b. Pekin, Ill. He was educated University of Chicago and University of Michigan. Professor of chemistry, Univ. of Nebraska, 1874-9; geologist Wyoming Territory, 1883-7, professor metallurgy, State School of Mines, S.D. 1888-9; assistant California Mining Bureau 1900-1; engaged on Death Valley Explorations, 1901-3; professor of geology Univ. of Southern California since 1909. Member Phi Delta Theta. Author of numerous works on mining and geology, and has also contributed to magazines. Traveled in Mexico, Central and South America.

BAILEY, JOSEPH WELDON (1863); senator; b. Copiaco, Miss. Admitted to Bar, 1883; presidential elector from Georgia, 1884; removed to Gainesville, Tex., 1885; presidential elector-at-large, 1888; member of 52nd to 56th congresses; caucas nominee of Democratic party for speaker, 55th congress; U.S. Senator for terms, 1901-7 and 1907-13; resigned 1912 and re-engaged in practice of law in Washington.

BAILEY, LIBERTY HYDE (1858); author; b. S. Haven, Mich. He studied at Michigan Agricultural College. Interested in botanical and horticultural subjects and in rural problems and education; assistant to Asa Gray, Harvard, 1882-3; professor horticultural and landscape gardening, Michigan Agricultural College, 1885-8; professor horticulture, Cornell, 1903-13. Awarded Veitchian medal, 1898. Member of numerous associations and fellow American Association of Arts and Sciences. Author: *Survival of the Unlike, Evolution of our Native Fruits, Lessons with Plants, Beginners' Botany, Principles of Fruit Growing*, etc.

BAILEY, NATHAN (d. 1742), Eng. lexicographer; was a Stepney schoolmaster and Seventh-day Baptist; pub. *Dictionarium Britannicum, or Universal Etymological English Dictionary* (1721), which had a wide sale and was frequently enlarged and improved. It served as the foundation of Dr. Johnson's later work, and was used by Chatterton in his composition of the 'Rowley Poems.'

BAILEY, SOLON IRVING (1854); astronomer; b. Lisbon, N.H. He was educated at Boston University and Harvard. Went to Peru for the purpose of investigating conditions there in order to find a satisfactory location for a southern station for Harvard College Observatory, 1899; examined west coast from Equator to Southern Chili, Arequipa, Peru, being selected for purpose; directed work there since 1892; established meteorological station on summit of El Misti, highest scientific station in

the world, 1893; various professional posts 1893-1913; Phillips professor, 1913. Member of numerous learned societies. Visited S. Africa in 1908 for astronomical purposes.

BAILEY, VERNON HOWE (1874), artist; b. Camden, N.J. He was a student at Pennsylvania Academy of Fine Arts and studied in London and Paris. Staff artist Philadelphia Times, 1892-4, Boston Herald, 1894-1901; special artist for latter at coronation of Edward VII; has contributed to Graphic, Mail and Express, London, and to the Studio, (London) Ueber Land und Meer (Struttgart) etc. Exhibited at Pennsylvania Academy of Fine Arts, Philadelphia, 1891. Has illustrated many books, special subjects being city streets, picturesque towns, etc. of Europe and America.

BAILEY, WILLIAM WHITMAN (1843-1914), botanist; b. West Point, N.Y. He was educated at Brown University; studied botany at Columbia, 1872; Harvard Summer School, 1875, 1876, 1879. Assistant in chemistry, Mass. Inst. Tech. 1886; assist. chemist, Manchester (N.H.) Print Works, 1886; botanist, U.S. Geological Survey of 40th parallel, 1867-8; assistant librarian Providence Athenaeum, 1869-71; various professional posts, 1877-1906; professor emeritus Brown University 1906-1914. Special beneficiary of Carnegie Foundation, 1906. Member various scientific associations, and author of *Botanical Collectors' Handbook*, 1881, *Botanical Note Book*, 1894.

BAILEY, OLD, the Central Criminal Court, London.

BAILEY, PHILIP JAMES (1816-1902), Eng. poet; b. Nottingham, where his f. was a newspaper proprietor; his fame depends entirely upon his long poem, *Festus*, pub. anonymously (1839), which had a very extensive sale both in England and America; member of Spasmodic School.

BAILEY, SAMUEL (1791-1870), Eng. philosophical writer; pub. *Essays on the Formation and Publication of Opinions* (1821), *Essays on the Pursuit of Truth* (1829), *Money and its Vicissitudes*, *Theory of Reasoning*, etc.

BAILIFF.—(1) Officer app. by a peer or other landed proprietor to manage his estates, collect rents, etc. (2) A sheriff's officer app. to summon Juries, collect fines, etc. (3) County Court b., vulgarly called 'bum-bailiff,' serving under the high-bailiff, who is responsible for the serving and execution of distress warrants.

BAILIWICK, district over which the jurisdiction of a bailiff or sheriff extends.

BAILLEUL, tn., Nord, France (50° 47' N., 2° 43' E.); occupied by Germans (1914 and 1918); center reduced to ruin. Pop. (before Great War) 13,200.

BAILLIE, LADY GRIZEL (1665-1746), Scot. poetess; dau. of Sir Patrick Home (afterwards Earl of Marchmont); m. George Baillie, s. of the Scot. patriot, Robert B. of Jerviswood; she left numerous songs in MS., besides those pub. during her lifetime, her best-known lyric being *Werena my heart licht I wad dee*.

BAILLIE, JOANNA (1762-1851), Scot. dramatist and poet; dau. of the minister of Bothwell, in Lanarkshire; began to pub. verse at an early age, but is chiefly remembered for her *Plays on the Passions* (1798), which was followed by several other vol's of a like character. Her dramas were little suited for stage representation.

BAILLIE, ROBERT (1599-62), Scot. theologian; member of Glasgow Assembly (1638); chaplain in Leslie's Scot. army; prof. of Divinity, Glasgow (1642); one of the commissioners sent to Holland (1649) to invite Charles II. to Scotland. His *Letters and Journals* are of considerable hist. value.

BAILMENT, delivery of goods in trust on a contract, express or implied; may be delivered to be kept gratis for the bailor, to be used gratis or for hire by the bailee, or for the bailee to do something to them gratis or for reward. Gratuitous bailee only liable for gross negligence. Fraudulent bailee guilty of larceny.

BAILY, EDWARD HODGES (1788-1867), Eng. sculptor; b. Bristol; s. of a naval wood-carver; entered R.A. Schools (1809); gold medal (1811); R.A. (1821); carved some of the bas-reliefs on the Marble Arch, and was responsible for the Nelson Statue in Trafalgar Square.

BAILY, FRANCIS (1774-1844), Eng. astronomer, pioneer of modern solar eclipse expeditions; superintended preparation of star catalogues; one of leading founders of R. Astronomical Soc.; observed and described the discontinuous beadlike effect occurring in the visible crescent of the sun at times of eclipse, called *Baily's Beads*.

BAIN, ALEXANDER (1818-1903), Scot. philosopher; b. Aberdeen; was a weaver in early life, later entered Marischal Coll.; prof. at Aberdeen and Glasgow; subsequently moved to London, and pub. *The Senses and the Intellect* (1855), *The Emotions and the Will* (1859); prof. of Logic and English in

the Univ. of Aberdeen from 1860-80. His later publications include *Higher English Grammar* (1863), *Manual of Rhetoric* (1866), *Manual of Mental and Moral Science* (1868).

BAINBRIDGE, WILLIAM (1774-1833), an American naval officer, born at Princeton, N.J. He entered the navy in 1798 and served with distinction against France in that and the following year. In 1800 he commanded the fleet which carried tribute to Algiers, and in 1804 was captured by the Tripolitans. He served with distinction in the War of 1812 and in 1815 commanded a squadron against Algiers. From 1824 to 1827 he was a member of the Board of Navy Commissioners.

BAIRD, SPENCER FULLERTON (1823-1887), an American scientist, born at Reading, Pa. For many years he was Secretary of the Smithsonian Institution and was also chief government commissioner of fish and fisheries. He wrote many books on subjects relating to natural history, of which perhaps the best known is *History of North American Birds*.

BAIRNSFATHER, BRUCE (1888), humorist and war artist; attained instant popularity in *Fragments from France* (1915), sketches depicting in a humorous spirit life in the trenches; author of *Bullets and Billets*, etc.; his play, *The Better 'Ole*, has been staged and filmed all over the English-speaking world; wounded during the war.

BAJA, town, Bacs-Bodrog, Hungary (46° 11' N., 18° 57' E.); imposing castle; trade in fruit, grain, hogs; alcohol extensively manufactured. Pop. 20,000.

BAJAUR, small terr., N.W. Frontier Province, India (34° 45' N., 71° E.); inhabited almost entirely by Pathans; chief town, Nawagal. Area, c. 5,000 sq. m.; pop. c. 100,000.

BAJAZET (or BAYAZID) I. (1347-1403), Turk. sultan, known as Ilderim, or 'Lightning,' for his Balkan victories. Bajazet II. (1447-1512), a mosque-builder and patron of learning; forced to abdicate in 1512.

BAKARGANJ, dist., Eastern Bengal and Assam, India (22° 30' N., 90° 30' E.); three crops of rice annually; mostly inundated during rains. Area, 3,645 sq. m.; pop. 2,300,000.

BAKELITE, an amber-like substance, characterized by electrical insulating properties, great strength, insolubility, and resistance to chemicals; produced in U.S. from chemical union of phenols and formaldehyde; used for pipes, jewelry, etc.

BAKER, city of Oregon and county seat of Baker co., on the Powder River and Oregon railroad. It has grown rapidly, due to the fact that it is the center of a rich agricultural, stock-raising and gold-mining district. It was settled in 1860 and incorporated in 1872. It is under a commission form of government. Its water works are municipally-owned. Pop. 1920, 7,729.

BAKER, ARTHUR LATHAM (1853), mathematician; b. Cincinnati. He studied at the University of Gottingen, 1896; attorney-at-law, Scranton, Pa., 1885-7; principal high school, Scranton, 1882; editor Common Pleas Reporter and Weekly Digest, Scranton, 1885-91; University of Rochester, 1891-1901; head of Dept. of Mathematics, Manual Training High School, Brooklyn, 1901-17; sec. Rochester Academy Science, 1892-9. Author: *Annual Digest Pennsylvania Supreme Court Decisions*, 1886-7; *Graphic Algebra*, 1892; *Elliptic Functions*, 1890; *Solid Geometry*, 1893, etc.

BAKER, CHARLES FULLER (1872), Amer. botanist and zoologist, author of *Invertebrata Pacifica*; *Economic Plants of the World*.

BAKER, CHAUNCEY BROOKE (1860), military officer; b. Lancaster, O. He graduated from the U.S. Military Academy, 1886; hon. graduate Infantry and Cavalry School, Fort Leavenworth, Kansas, 1889; duty in office of Q-M Gen. War Department, 1902-6; commanding Philadelphia Depot, Q-M Dept. 1909-12; duty office Q-M Gen. 1912-14; depot and base Q-M Vera Cruz expedition, 1914; duty office Q-M Gen., 1914-16; sr. mem. Mil. Comm. to France, 1917; chief embarkation service, office chief of staff, War Dept. 1917-18. Author of several works on military subjects. Retired from army 1921.

BAKER, FRANK COLLINS (1867), zoologist; b. Warren, R.I. He was educated at Brown Univ. Jessup scholar, Acad. Natural Sciences, Phila., 1889-90; B.S. Chicago School of Science, Philadelphia, 1889-90. Member of Mexican Exploring Expedition, 1890; curator Chicago Academy of Sciences, 1894-1915; zool. investigator New York State College of Forestry, Syracuse, N.Y., 1915-17; curator Nat. History Museum, Univ. of Illinois since 1918. Member of various learned societies. Author: *A Naturalist in Mexico, Mollusca of the Chicago Area, Shells of Land and Water, The Lymnaeidae of North and Middle America*, etc.

BAKER, GEORGE BARE (1875), b. Wyandotte, Mich. On Detroit Tribune,

and Detroit Journal, 1895-9; European correspondent, Detroit Journal, 1901-2; McClure's Magazine (English office) 1902; art critic 'Academy and Literature' (Eng.) 1903; American correspondent London Daily Express, 1904-05; journalist secretary to Joseph Pulitzer, 1906; associate editor, Everybody's Magazine, 1907-10; literary editor De-lineator, 1911-14. Director American Relief Administration; secretary Commission for Relief of Belgium; attached to director-general of relief under Supreme Economic Council, Paris, during Peace Conference, 1919.

BAKER, GEORGE PIERCE (1866), educator; b. Providence, R.I. He was educated at Harvard; various posts 1888-1905, since when professor of English at Harvard. Author: *The Principles of Argumentation*, 1895, 1905; *The Development of Shakespeare as a Dramatist*, 1907; *Dramatic Technique*, 1919. Has edited various works, including: *Specimens of Argumentation* 1893; *The Forms of Public Address*, 1904; *Belles Lettres Series, Section III*; *David Garrick*, 1907. Also various Elizabethan plays. Hyde lecturer the Sorbonne, Paris, 1907-8.

BAKER, HENRY (1698-1774), Eng. naturalist, poet, and teacher of deaf-mutes; he helped to found the Society of Arts, and introduced into Britain rhubarb and the Alpine strawberry.

BAKER, MOSES NELSON (1864), editor; b. Enosburg, Vt. Associate editor Engineering News, 1887-1917, and from 1917 of Engineering News-Record. Editor Manuel of American Water Works, Municipal Year Book, 1902. Author: *Sewerage and Sewage Purification*, 1896; *Potable Water*, 1899; *Municipal Engineering and Sanitation*, 1901; *Municipal Engineering Topics in International Year Book*, 1898, 1899 and 1907. Also in *International Encyclopedia*; *British Sewage Works*, 1904; *Notes on British Refuse Destructors*, 1906.

BAKER, NEWTON DIEHL (1871), former Secretary of War and lawyer; b. Martinsburg, West Va. He was educated at the Johns Hopkins and the Washington and Lee University, receiving the LL.B. degree from the latter seat of learning, in 1894. Two years later he began his career as private secretary to Postmaster-General Wilson in Cleveland's administration, holding that office till 1897, when he opened a law practice in his home town. Later he removed to Cleveland, O., where he served as city solicitor from 1902 to 1912, and as mayor for two terms (1912-1916). On March

7, 1916, President Wilson appointed him Secretary of War in succession to Lindley M. Garrison, a cabinet post he held throughout the World War and until the Wilson administration went out of office on March 4, 1921. In the latter year he became commanding colonel of the Officers' Reserve Corps.

Both as mayor of Cleveland and as Secretary of War he attracted nationwide attention. In Cleveland his administration attracted wide attention. He introduced a number of innovations in the administration of the city government. He entered the Wilson Cabinet with the reputation of a pacifist, but on the United States declaring war against Germany in 1917 he vigorously supported the President in all war measures, notably the Selective Draft, and made several journeys to France to inspect the American sectors.

BAKER, RAY STANNARD (1870), ('David Grayson') writer; b. Lansing, Mich. He studied law and literature in the Univ. of Michigan. On Chicago Record, 1892-7; managing editor McClure's syndicate, 1897-8; associate editor McClure's Magazine, 1899-1905; one of editors of American Magazine, 1906-15. Supply commander Dept. of State in Great Britain, France and Italy, 1918; director Press Bureau of American Commission to Negotiate Peace at Paris, 1919. Author: *Boys' Book of Inventions*, 1899; *Our New Prosperity*, 1900; *Seen in Germany*, 1910; *Second Boys' Book of Inventions*, 1903; *Following the Color Line*, 1908; *New Ideals in Healing*, 1909; *What Wilson Did at Paris*, 1919; *The New Industrial Unrest*, 1920; Also under pen name of 'David Grayson,' *Adventures in Contentment*, 1907; *Adventures in Friendship*, 1910; *The Friendly Road*, 1913; *Hempfield*, 1915; *Great Possessions*, 1917; contributed largely to American periodicals, writing chiefly on social and economic subjects. He published in 1922 an extensive record of the Paris Peace Conference, from the records and papers of President Wilson.

BAKER, SIR SAMUEL WHITE (1821-93). Eng. explorer, who traced the course of the White Nile, and discovered and named the Albert Nyanza. He wrote *The Albert Nyanza* (1866), *Ismailia* (1874), etc. *Memoirs* pub. 1895.

BAKER, THOMAS STOCKHAM (1871), an American educator, b. in Aberdeen, Md. He graduated from Johns Hopkins University in 1881 and afterwards studied at the University of Leipzig. He was for several years on the faculty of the Johns Hopkins University as lecturer on modern German

BAKER ISLANDS

literature, and professor of German. From 1899 to 1919 he was director of the Jacob Tome Institute, and from 1919 to 1923 was Secretary of the Carnegie Institute of Technology. In the latter year he was elected President of this institution. He edited many German text books and contributed articles to periodicals.

BAKER ISLANDS, guano islands, Pacific (0° 13' N., 176° 29' W.); devoid of water; under Brit. protection.

BAKERSFIELD, a city of California, the county seat of Kern co. It is on the Southern Pacific, and the Atchison, Topeka and Santa Fe railroads, and on the Kern River. The city is within a natural gas, oil, agricultural and fruit growing region. Its industries include foundries and machine shops. In the neighborhood are important deposits of gold, gypsum, marble and sulphur. Pop. 1924, 24,229.

BAKHTEGAN (NIRIS), salt lake, Persia (29° 20' N., 54° E.); yields salt. Area, 400 sq. m.

BAKING POWDER. 'A substitute for yeast, consisting of two or more compounds which react in the presence of moisture with the production of carbonic acid gas. A filler of flour, starch or corn meal is also generally added. The carbonic acid gas is almost invariably derived from bicarbonate of soda, and the acid constituent which causes the evolution of the gas may be tartaric acid, citric acid, acid calcium phosphate, cream of tartar, or a salt of lactic acid. Until fairly recent years the use of alum was common, but this is now looked upon with disfavor, partly because alum bleaches flour and so permits an inferior quality to be used, and partly because of its harmful physiological effect. Ammonium carbonate is occasionally used in addition to bicarbonate of soda. Powders made with tartaric acid and bicarbonate of soda give off twenty-five times their volume of gas, while cream of tartar powders yield only thirteen volumes. The latter, however, are sometimes preferred because they do not give off their gas so quickly, and so dough mixed with them can be kept longer before baking than dough mixed with the tartaric acid powders. A home-made baking powder is frequently made by using bicarbonate of soda in conjunction with sour milk, and in this case the acid is supplied by the lactic acid in the milk. As, however, the degree of acidity of the milk is very uncertain, such a mixture is not so reliable as the standard powders. See BREAD.

BAKLANOFF, GEORGES (1882), a

BALA

singer; b. in Petrograd, Russia. He was educated at Petrograd Univ., graduating 1904; studied singing under Vittorio Vanzo. First appearance in Rubenstein's *Demon*, 1905; appeared later in London at Covent Garden, and in Berlin, Vienna, Moscow, Petrograd, Monte Carlo, Budapest, Stockholm, Munich, etc. Came to America, 1909; first with Boston Opera Co., and later with Metropolitan Opera Co. Became member Chicago Opera Association, 1917.

BAKST, LEON NIKOLAJEWITSCH (1886), Russian painter and decorative artist; educated in Petrograd, later studying art; went to Paris under the patronage of a Russian Grand Duchess, subsequently returning to Russia and working in Moscow. Painted conventional portraits, several examples being in the Tretlakoff Gallery, Moscow. His political ideas displeased the authorities and he settled in Paris in 1906, where he soon attracted attention as a designer. On the visit of the Imperial Russian Ballet to Paris in 1909, Bakst became famous through his designs for the settings of the ballets *Scheherazade* and *Cleopatra*, which successes were followed in 1912 by *L'Après-Midi d'un Faune*, *Helene de Sparte* and *St. Sebastian*, and 1913 by *La Pisanella*. Made Officer de la Legion d'Honneur. Member of the Russian Academy of Beaux Arts. The ballet of *Oriente* was staged in New York in 1914 with Anna Pavlova in the leading role. Bakst's designs are characterized by remarkable richness and color brilliancy, and his drawing, though conventional, is highly individualized, the whole demonstrating his extraordinary powers of imagination and invention. Published in 1910 in the *Nouvelle Revue* in Paris *Les Problemes de l'Art Nouveau*. He visited the United States in 1922-3.

BAKU, cap., repub. of Azerbaijan, at head of bay on S. side of Apsheron Peninsula, Caspian Sea (40° 23' N., 49° 53' E.); one of richest petroleum fields of world, ten million tons exported annually before World War; wells on Balakhani Peninsula; pipe lines to 'black town' with refineries; pipe line to Batum (560 m.). Defended against Turks by 'Dunsterforce' (Aug. 4 to Sept. 16, 1918). Pop. 232,200. For subsequent history see Russia.

BAKUNIN, MIKHAIL (1814 - 76), Russian revolutionary and political writer; organized anarchical movements and democratic associations all over Europe; frequently extradited.

BALA. (1) Mkt. tn., Merionethshire, Wales (52° 54' N., 3° 35' W.);

flannel. Pop. 1,500. (2) Bala Lake, largest lake in Wales; 4 m. long by 1 m. wide; expansion of riv. Dee.

BALAAAM, a Gentle prophet whom Balak, King of Moab, sent for to curse Israelites (Num. 22-24).

BALA BEDS (Caradoc Group), consist of sandstones, shales, and fossiliferous (brachiopods, trilobites, graptolites) limestones, forming upper Ordovician; type locality, Bala.

BALENA. See **WHALE**.

BALÉNICEPS ('whale-headed') a stork, with very broad and long beak; found on upper Nile.

BALAGHAT, dist., Central Provinces, India (21° 50' N., 80° 20' E.); sub-alpine. Area, 3,132 sq. m.; pop. 326,500.

BALAKLAVA, seapt. and health resort, Crimea, Russia (44° 30' N., 33° 27' E.), port of Læstrigonians at which Ulysses is said to have touched; Brit. headquarters during Crimean War; indecisive battle (Oct. 25, 1854), in which the Light Brigade and the Heavy Brigade distinguished themselves by remarkable charges.

BALALAIKA, a Slav. stringed instrument, very popular as an accompaniment to dances and folk-songs amongst the Russ. peasantry; has triangular sounding board, fitted with a long wooden neck, strung with from two to four strings, which are plucked with the fingers.

BALANCE, appliance for comparing weights and forces.

BALANCE OF POWER, term for a systematic effort on the part of a state or group of states to restrain any other state or group of states from obtaining a predominance which tends to endanger their independence. European history from 16th to 20th cent. dominated by the varied grouping of powers to maintain this balance. Accident of dynastic succession gave immense agglomerative power to Emperor Charles V., and France, with some assistance from England, resisted this overgrown power; under Philip II. predominance of Spain destroyed by union of maritime strength of England, France, and Holland. Habsburg ascendancy destroyed by Treaties of Westphalia (1648) and the Pyrenees (1659), with the result that France under Louis XIV. became dominant. Fr. ascendancy was finally broken by Marlborough and Prince Eugène. Treaty of Utrecht a deliberate and not unsuccessful attempt to establish equilibrium, which though occasionally shaken, was not overthrown in XVIII. cent. During this period the doctrine under-

went a perversion—viz., principle of equality of this was fatal to smaller states, as seen in partition of Poland. After Fr. Revolution France under Napoleon gained most marked ascendancy ever known in Europe; coalition overthrew him, and balance was restored by settlement of 1815. Nineteenth cent. distinguished by uneasy but fairly stable equilibrium. Rise of Ger. Empire (1871) and alliance with Austria-Hungary created new and disquieting force, which brought about alliance between Russia and France, and an imperfectly defined understanding between these powers and Britain. This division of Europe into two groups created situation which developed into the World War. Now proposed to guard against similar dangers in future by formation of League of Nations.

BALANCE, SPRING, a form of weighing machine in common use, consisting of a spirally wound steel spring usually inside a frame or case fitted with a ring for hanging from a support. One end of the spring is fastened to the upper end of the case, while the other end terminates in a rod ending in a hook, which protrudes from the case. In some balances a pointer is fastened directly on the movable end of the spring, or its rod, and slides over a calibrated scale. In other forms of spring balances, the rod carries a small rack which meshes with a pinion on a small shaft carrying a pointer. This pointer moves over a graduated dial.

Both these methods serve to indicate the extent to which the spring is stretched by any force or weight applied to the movable end. According to Hooke's law, the amount of deflection of the spring is directly proportional to the weight or magnitude of the force applied to the hook; thus the scale is uniform, and may be calibrated in any system of units of weight desired. Spring balances are usually used where rapid and clear indications, rather than accurate measurements are required.

BALANOGLOSSUS, a primitive chordate animal, worm-like in habits and appearance, and found burrowing in sand or mud in shallow sea water. The body is in three divisions; proboscis, containing the notochord; ring-like collar, in front of which the mouth lies; and long trunk, with segmentation only in the respiratory and genital organs. Within it are many gill-slits which open to the exterior by gill-pores. The free pelagic larva is known as a Tornaria.

BALAOAN, or **BALAOANG**, tn., Luzon I., Philippines (16° 48' N., 20° 27' E.). Pop. 10,000.

BALAPUR

BALAPUR (20° 40' N., 76° 48' E.), town, Berar, India. Pop. 10,500.

BALARD, ANTOINE JEROME (1802-76), Fr. chemist; discovered Bromine; numerous researches in pure and applied chem.

BALASINOR (22° 59' N., 73° 16' E.), dependency of Guzerat, India. Pop. 40,600. Capital, B. Pop. 9,000.

BALASORE, (21° 30' N., 87° E.), district and seaport, Orissa division, Bihar and Orissa, India; early Brit. settlement (1642); produces rice; area, 2,085 sq. miles. Pop. 1,100,000.

BALAS RUBY, a transparent rose-red variety of spinel, a mineral composed of magnesia and alumina; like true ruby in color, but softer, owing to presence of magnesia.

BALATA, gum from tree of tropical America; same natural order as gutta-percha trees; used in place of rubber, but also in conjunction with it for coating of canvas driving belts.

BALATON (46° 45' N., 17° 45' E.), largest lake, Hungary; c. 60 by 10 miles.

BALAYAN (13° 51' N., 120° 42' E.), seaport and bay, Luzon, Philippine Islands. Pop. 8,500.

BALBI, ADRIANO (1782-1848), Ital. geographer, whose writings were noted for accuracy. S., Eugenio B. (1812-48), was prof. and geog. writer.

BALBI, GASPARO (fl. XVI. cent.), traveler; made explorations in India and wrote *Viaggio nelle Indie Orientali* (1590).

BALBO, CESARE, COUNT (1789-1853), Ital. author and statesman; b. Turin; served in various capacities under Napoleon, after whose fall he devoted his energies entirely to his native country. He had no expectation of a truly united Italy, but speculated upon a confederation of states under the papal supremacy; pub. *Vita di Dante* (1839), and several works advocating Ital. independence.

BALBOA, VASCO NUNEZ DE (1475-1517), Span. explorer; of noble birth; began life as an adventurer, and developed into an able general and administrator; founded a colony on the Darien Isthmus; discovered the Pacific (1513) and received from King Ferdinand title of 'Admiral of the South Sea.' His brilliant successes, however, aroused the jealousy of Don Pedro Arias de Avila, the new gov. of the Darien colony, who put forward a false charge against him and secured his execution.

BALDNESS

BALBRIGGAN (53° 37' N., 6° 12' W.), seaport and market town, County Dublin, Ireland; hosiery.

BALBUS, L. CORNELIUS, native of Gades, became a Roman citizen; managed private affairs of Julius Cæsar, whom he accompanied as engineering officer to Spain and Gaul; became consul 40 B.C.—the first of foreign birth to be so honored.

BALCH, EMILY FREEN (1867), economist. She was educated Bryn Mawr; studied political economy Paris, University of Chicago, Berlin; connected with Denison House, Boston, 1892-3; member municipal board of trustees for children, 1897-8; various professorial posts, 1896-1913; and from 1913-18 professor of political economy and political and social science, Wellesley College; editorial staff of Nation, New York. Member various boards and commissions and was delegate to International Congress of Women at The Hague, and delegate from this congress to the Scandinavian and Russian governments, 1915. Wrote several books.

BALCONY (Ital. *balcone*, from O.H.G. *balcho*, beam), platform projecting from wall of a building inside or outside, and enclosed by a parapet; the outside b., great feature of Renaissance architecture, is attached to the window; the inside runs round almost entire wall as in theatre or concert-hall; usually supported by consoles, but may have invisible iron supports.

BALDACHIN(O) (Ital. *baldacchino*), canopy used in R.C. Church to carry over priest in procession, or stationed over altar or pulpit; made later of architectural materials.

BALDER, BALDR, BALDUR, Teutonic god of light and justice; in the Edda, son of Odin and Freya; everything in creation but mistletoe took oath not to injure him; slain by mistletoe-shaft through cunning of Loki; in the Ragnarvök (*Götterdämmerung*) returned to Asgard; different version preserved by Saxo Grammaticus.

BALDNESS, loss of hair, is due to follicles losing productive power. Causes may be: wearing of a hat, which by pressure lessens flow of blood to head; excessive perspiring about head; excess of dandruff. Treatment is mostly preventive; dandruff is removed by washes, e.g. spirit of soap, bay-rum, perchloride of mercury; in the country no hat should be worn; hard brushes irritate the scalp and produce dandruff. *Alopecia areata*, patchy b., occurs in animals.

BALDRIC

BALDRIC, belt worn from either shoulder crossing the body diagonally; used as ornament or to sustain sword, dagger, or horn.

BALDUNG, HANS, HANS GRÜN (1476-1545), Ger. artist; a friend of Dürer; his *Crucifixion*, a masterpiece, is in Freiburg Cathedral.

BALDWIN I., (d. 1118), king of Jerusalem; 2nd s. of Eustace II. of Boulogne; went on First Crusade, 1096; established Christian principality of Edessa, 1098 (which lasted 47 years); succ. his bro. Godfrey de Bouillon as king of Jerusalem, 1100.

BALDWIN II. (d. 1131), king of Jerusalem; e.s. of Hugh, Count of Bethel; succ. his cousin, B. I., as Count of Edessa, 1100, and as king of Jerusalem, 1118; relieved Antioch (1119), besieged by Saracens; taken prisoner (1123). He was ransomed (1124) and extended his kingdom by continual wars. At his death it included all Syria, but the territories of Aleppo, Damascus, Emesa, and Hamaah. The religious Orders of the Knights of the Temple and Hospital of St. John of Jerusalem date from his reign, he granting them their places of abode and obtaining papal confirmation. His character was pious and ascetic.

BALDWIN IV., king of Jerusalem (1174-83). The weakness of his rule prepared way for Saladin's conquests.

BALDWIN I. (d. 1205), emperor of Rumania (1204); as Count of Flanders and Hainault was leader in Fourth Crusade by which Constantinople was captured and Latin Empire of Rumania formed.

BALDWIN II. (1217-73), last Frankish emperor of Rumania; s. of Pierre de Courtenay; succ. elder bro. Robert as emperor, 1228. Michael Palaeologus drove B. from Constantinople, 1261.

BALDWIN (d. 1191), abb. of Canterbury; d. during siege of Acre in Third Crusade.

BALDWIN, EVELYN BRIGGS (1862), explorer; b. Springfield, Mo.; observer U.S. Weather Bureau, 1892-1900. Accompanied Peary on N. Greenland expedition, 1893-4 as meteorologist; meteorologist and second in command of Walter Wellman's polar expedition to Franz Josef Land, 1898-9; built and named Fort McKinley; discovered and explored Graham Bell Land, 1899; organized and commanded Baldwin-Zeigler polar expedition, 1901-2, etc. Established four depots of supplies from south to north coast of Franz Josef Land

BALDWIN

as bases for dash to North Pole. Member of National Geographical Society and of other historical and scientific societies. Author of *Search for the North Pole* and of *Auroral Observations*, Franz Josef Land, 1898-9.

BALDWIN, F(OY) SPENCER, (1870); economist and author; b. Charlotteville, Michigan; educated Boston University and University of Munich; m. Cordelia S. Losey, 1896. Assistant editor Vermont Watchman, Montpelier, 1889; taught at St. Luke's School, Philadelphia, 1890-1; studied economics in Germany, 1892-3; instructor economics, Norwich, Conn., Free Academy, 1894; professor economics, 1895-14. Manager New York State Insurance Fund, 1914-1919; specialist in compensation insurance; editorial writer, Boston Transcript, 1900-14; lecturer on sociology Massachusetts Institute of Technology, 1903; chairman trustees of statistics Dept., City of Boston, 1909-14; member commission on labor, National Council Defense, 1917.

BALDWIN, FRANK DWIGHT (1842), major-general of U.S.A.; b. Manchester, Mich.; educated public schools Constantine, Mich., and Hillsdale College. Served in Civil War. Transferred to regular army in 1866. Breveted captain in 1890 'for gallantry in action against Indians in Texas,' and major 'for gallantry and successful attack on Sitting Bull's camp of Indians on Red Water River, Mont.,' Dec. 18. Commanded first body of civilized troops that ever was successful in reaching the southern shore of Lake Lanao. Retired 1906.

BALDWIN, JAMES (1841), writer; b. Hamilton co., Ind., Dec. 15, 1841; for the most part self-educated; teacher from 1865-1887; in educational department of Harper & Bros., 1887-90; assistant editor Harper's periodicals 1890-3; editor of school books for American Book Co., 1894-1918. Author: *The Story of Siegfried*, *The Story of Roland*, *The Book Lover*, *A Story of the Golden Age*, *Six Centuries of English Poetry*, *The Book of Elegies*, *Famous Allegories*, *Fairy Stories and Fables*, *Fifty Famous Stories Retold*, *Old Greek Stories*, *The Discovery of the Old North-West*, *Hero Tales Told in School*, *Thirty Most Famous Stories*, etc.

BALDWIN, JAMES MARK (1861); American philosopher; held professorships at Toronto, Princeton and Johns Hopkins Univ's; founded Psychological Review; pub. *Handbook of Psychology* (1890), *Elements of Psychology* (1893), *Story of the Mind* (1898), etc.

BALDWIN, SIMEON EBEN (1840), public official; b. New Haven, Conn. He was educated at Yale, and studied law at Yale and Harvard; admitted to the bar 1863; instructor of law, 1869-72; professor of law 1872; associate justice, 1893-1907; chief justice, 1907-1910, Supreme Court of Errors of Conn.; Governor of Conn. terms 1911-13, 1913-15.

BALDWIN, STANLEY (1867); an English statesman. He was educated at Harrow and at Trinity College, Cambridge. Entering politics, he was elected to Parliament in 1906. His ability as a student of finance and economics early attracted attention and in 1917 he was appointed Financial Secretary of the Treasury, serving until 1921. He was appointed Chancellor of the Exchequer in the Bonar Law Cabinet of 1922, and in that capacity visited the United States as a member of the British Debt Commission. On the resignation of Bonar Law as Premier, in May, 1923, Baldwin was chosen his successor. He resigned following the defeat of his party in Parliament, Jan. 20, 1924.

BALE, JOHN (1495-1563); Eng. author and bp. of Ossory; b. Cove, near Dunwich, Suffolk; wrote plays and pamphlets against R.C. party, 1538 onwards. He fled to Germany on the fall of Thomas Cromwell; returned under Edward VI., and was made bp., 1552; exiled, 1553-58. His history of Eng. lit. contains valuable information; also his play *Kings Johan*.

BALEARIC ISLANDS (39° 30' N.; 3° E.), islands, off Span. coast, Mediterranean; belonged in turn to Carthaginians, Romans, Vandals, Moors, Aragonese; independent kingdom, 1232-1349, and subsequently united to Spain; famed for slingers in antiquity; include Majorca, Minorca, Iviza, Formentera, and eleven small islands; area, c. 1930 sq. miles; largest town, Palma, Manacor Port Mahon; fine climate; produce fruit, wine, oil, grain; export fish. Pop. 325,700.

BALFE, MICHAEL WILLIAM (1808-70), Irish composer and vocalist; s. of dancing master; b. Dublin; for many years operatic singer in Italy and England; composed many operas in English, French, and Italian with remarkable success, of which the best known in Britain is his *Bohemian Girl*.

BALFOUR, EARL OF, ARTHUR JAMES (1848). Brit. statesman and author; eldest son of James Maitland Balfour of Whittingehame, Haddingtonshire, and Lady Blanche Cecil, daughter of 2nd Marquess of Salisbury; Conserva-

tive member for Hertford (1874), and became private secretary (1878) to Lord Salisbury, then foreign minister; a member of the 'Fourth Party'; president of Local Government Board (1885-6); secretary for Scotland, with seat in cabinet (1886-7); chief secretary for Ireland (1887-91); carried Crimes Act through Parliament and set up Congested District Boards; first lord of Treasury and leader of House of Commons (1891-1902). On retirement of Lord Salisbury (1902) he became prime minister; passed Education Act, Irish Land Purchase Act, Licensing Act, Scottish Churches Act, Unemployed Act, and Aliens Act; instituted the Army Council and Imperial Defence Committee; cemented the *Entente Cordiale* with France. His undecided attitude towards Mr. Chamberlain's tariff proposals contributed to the Unionist crisis and ultimate overwhelming defeat in 1906, after his resignation of office in Dec. 1905; but he soon regained prestige as most brilliant parliamentary dialectician of his time. Resigned Opposition leadership in Nov. 1911, being succeeded by Mr. Bonar Law. On outbreak of World War (1914) he was a foremost supporter of all necessary war measures, and in 1915 joined Mr. Asquith's Coalition government as first lord of the Admiralty. As foreign secretary in Mr. Lloyd George's ministry he wrote the famous letter to Sir Cecil Spring Rice, which covered the historic Allied dispatch to the U.S. government (Jan. 1917). After the U.S. entered the war he conducted successfully a most important mission to that country. In 1918 he attended the monthly meetings of the Supreme War Council, and in the following year was head of the Brit. delegation at the Peace Conference, writing most of the principal dispatches to enemy governments during its sitting. In October, 1919, Mr. Balfour resigned the foreign secretaryship, and became lord president of the Council, retaining contrary to usual custom, his seat in the House of Commons. He was the principal British commissioner to the conference in the Limitation of Armaments, in Washington, 1921-2, and on his return to England was created Earl of Balfour and Viscount Trapraire of Whittinghame, in recognition of his services in that and other political capacities. He is a metaphysician of note, and has written *A Defense of Philosophic Doubt* (1879) and *The Foundations of Belief* (1895). Chancellor of Cambridge Univ. (1919). An accomplished musician, keen golfer and tennis player.

BALFOUR, FRANCIS MAITLAND (1851-82). Scot. biologist, younger bro. of A. J. Balfour; brilliant morphologist

at Cambridge Univ.; author of widely recognized treatise on *Comparative Embryology*.

BALFOUR, GERALD WILLIAM (1853), brother of A. J. Balfour; M.P. for Central Div., Leeds (1885-1906); chief secretary for Ireland (1895-1900), where his policy aroused opposition of landlord class; raised to cabinet rank as president of the Board of Trade (1900); president of Local Government Board (1906); measures included reform of Patents Act (1902) and Sugar Convention Bill (1903); retired from public life in 1906.

BALFOUR, ISAAC BAYLEY (1853), son of John Hutton Balfour, one of most famous modern botanists; successively prof. of botany at Glasgow, Oxford, and Edinburgh, which latter post he still occupies; keeper of Royal Botanic Gardens, Edinburgh, and king's botanist in Scotland; amongst other works, trans. Goebel's *Organography of Plants*.

BALFOUR, SIR JAMES, Bart. (1600-57), Scot. antiquary; contributed to Dugdale's *Monasticon*; was knighted and made baronet by Charles I., and also Lyon King-at-Arms, from which office he was dismissed by Cromwell. His *Annales of Scotland* (from MSS. in Advocates' library, Edinburgh) were pub. 1824-25.

BALFOUR, SIR JAMES (d. 1583), Scot. Lord Pres. of the Court of Sessions; was deeply implicated in the murder of Darnley, is said to have drawn up the marriage-contract between Mary and Bothwell, and afterwards betrayed the Queen to her enemies. He was held to be the greatest lawyer of his day, and was perhaps one of the most infamous characters in Scot. history.

BALFOUR, JOHN HUTTON (1808-84), Royal botanist for Scotland; prof. of Botany at Glasgow and Edinburgh successively.

BALI, LITTLE JAVA (8° 30' S., 115° E.), island, Lesser Sunda group, E. of Java; mountainous and volcanic in center; loftiest peak Gunung Agung, 10,500 ft.; forms, with Lombok (separated by Lombok Strait), Dutch residency; capital, Buleleng; fertile, well cultivated; rice, cotton, coffee. Area, 2,300 miles. Pop. 525,600.

BALIKESRI (39° 35' N., 27° 50' E.), town, Turk. Asia Minor; great annual market in August. Pop. c. 20,000.

✱ **BALJOL**, Scot. family named from their fee of Bailloul, Normandy; Guy came to England with Conqueror; Bernard (Barnard) built Barnard Castle, Durham, early in XII. cent., and fought

at Battle of the Standard, 1138; his descendant, John, m. Devorgilla (who founded B. College, Oxford), descendant of David I. of Scotland, and was f. of King John B. (1292-96), f. of Edward B., king 1332-38, who lost favor in Scotland through subservience to Eng. kings; entire family seems to have died out XIV. cent.

BALUAG (14° 55' N., 120° 50' E.), town, Luzon, Philippine Islands; silk. Pop. 21,000.

BALIZE. See **BELIZE**.

BALKAN PENINSULA, easterly peninsula, S. Europe (36°-45° 36' N., 14° 30'-29° E.); bounded N. by Austria-Hungary, Rumania; S. by Mediterranean; E. by Black Sea, Sea of Marmora, and Aegean Sea; W. by Adriatic; includes Jugo-Slavia, Albania, Bulgaria, Turkey, and Greece. Rhodope plateau is core of peninsula; it is flanked by folds of Dinaric Alps (Mt. Dinara, 6,010 ft.), and Pindus Mts., on W., Balkans (Yumrukchal, 7,790 ft.) on E.; valleys fertile. Climate is Mediterranean on coasts, extreme in interior. Chief rivers are Danube and tribes, Vardar and Maritza; lakes, Scutari and Ochrida. Whole peninsula was under sway of Turks from 14th to 19th cents., when it began to break up; Greece obtained her independence in 1830; in 1878, by Berlin Treaty, Serbia and Rumania also obtained complete independence, the administration of Bosnia and Herzegovina was handed over to Austria-Hungary, and the principalities of Montenegro and Bulgaria were established; in 1885 E. Rumelia was annexed by Bulgaria, and 1908 Bulgaria was proclaimed an independent kingdom. Pop. is very mixed; consequent hostility of creeds tends to incessant unrest, and was prime cause of the international problem known as the Eastern Question, which culminated (1912) in the Balkan Wars. Peace of Bukharest left Rumania supreme and isolated Bulgaria; all were discontented. Austria invaded Serbia in 1914 and the World War began. Turkey and Bulgaria joined the Central Powers, Rumania and (later) Greece joined the Allies, whose base was Salonica. In Sept., 1918, a great offensive led to the submission of Bulgaria, Turkey and Austria. Area, c. 185,000 sq. m.; pop. c. 25,000,000. See **MAP NEW STATES OF S. E. EUROPE**.

BALKAN WARS (1912-13). In February, 1912, Bulgaria, Serbia, Greece, and Montenegro formed alliance against Turkey to force her to give local self-government to the Bulgar-Serb communities in Macedonia. On Oct. 8 Montenegro declared war and moved on

Scutari, which was besieged; on Oct. 14 Serbia took the field, and on Oct. 24 completely routed the Turks at Kumanovo. On Oct. 29 the Serbs entered Monastir. Meanwhile, the Bulgars had advanced down the Maritza, and had forced back the Turks to a fortified zone with two strongholds, Adrianople and Kirk Kilisseh, at the extremities. Kirk Kilisseh fell on Oct. 24, and the bombardment of Adrianople began Nov. 1. The Turks now fell back on Lüle Burgas. Leaving forces to invest Adrianople, the Bulgars sent their first army forward and captured Lüle Burgas on Oct. 29. Next day (Oct. 30) the Turks were forced to retreat in great disorder to the Chatalja lines defending Constantinople.

The Greeks joined in on Oct. 17 under Crown Prince Constantine and made Salonica their main objective. The port capitulated on Nov. 8. Meanwhile the Bulgars and Serbs before Adrianople had only captured four of the thirty permanent works. Scutari was holding out and winter was rapidly setting in. Thanks to a remarkable march through the snow by the Serbians, Alessio fell (Nov. 18). Operations against the Chatalja position began on the 17th, but the Bulgars found themselves outtranged in artillery. In middle of Nov. cholera broke out in Turkish camps, and on Dec. 3 an armistice was concluded—the armies to remain where they were, pending a peace conference. Greece refused to sign the armistice and continued the war. The Peace Conference met in London on Dec. 16; but it came to nothing, and the envoys were recalled. On the night of Feb. 3, 1913, hostilities were resumed; first real victory fell to the lot of the Greeks, who forced Janina to surrender (March 6); on March 24, 15,000 men surrendered to the Serbs, and on March 26 Adrianople fell. Meanwhile the powers had determined frontiers of Albania, but Montenegrins refused to withdraw; joint naval demonstration made on coast; Austria prepared to exert military pressure. Scutari was finally surrendered on April 25, but not until May 4 would the Montenegrins relinquish the place to the powers. Elsewhere the war was over, and on May 16 representatives of the five states met in London, and under Brit. pressure signed Treaty of London (May 30), by which Turkey lost all her European possessions W. of a line between Enos on the Sea of Marmora and Medla on the Euxine. The victors now began to quarrel amongst themselves. Serbia and Bulgaria had made secret treaty regarding disposal of captured territory, but Serbia now wished for modification, since Albania was not to be hers. The price of Rumania's neutrality was the cession of Silistria and

territory S. of Dobrudja; Ferdinand was loath to yield any of the predetermined spoils, and the consequence was that Serbia and Greece formed an anti-Bulgar alliance, and in June 1913 war blazed out again. By July 2 Bulgaria's position was critical, and the Porte seized the opportunity to recover Adrianople (July 22). Rumania now invaded Bulgaria, and on the following day, when the Greeks were in touch with the Serbian right wing, peace negotiations began. Treaty signed Aug. 10, giving Serbia whole of Macedonia then occupied by her, together with other territory (15,000 sq. m.), which nearly doubled her area. Greece obtained parts of Macedonia, Albania, and Thrace (18,700 sq. m.), and Rumania 7,000 sq. m., while Turkey retained a considerable area. Bulgaria's bitter resentment against Serbia continued, and was a considerable factor in bringing about her alliance with the Central Powers during the World War.

BALKASH, BALKHASH (46° 30' N., 75° 30' E.), salt water lake, Asiatic Turkey; about 300 miles long and 50 miles wide.

BALKH (36° 45' N., 66° 48' E.), city, on river B., Afghanistan; in ancient times, as Bactra, a flourishing trade center; now extensive ruins, modern town occupying only small portion of original city; associated with Zoroaster; destroyed by Jenghiz Khan, 1220.

BALL, a spherical or ovoid body of various substances, usually smooth, used in different games or as a missile. B. games have been played from very early times, and were very popular among ancient Greeks and Romans.

BALL, SIR ALEXANDER JOHN, Bart. (1759–1809), Eng. rear-admiral; served under Rodney and Nelson; commanded the Alexander at Battle of the Nile; blockaded Malta for two years, and eventually became gov. there; frequently mentioned in Nelson's dispatches.

BALL, JOHN (d. 1381), Eng. religious agitator; described by Froissart as the 'mad priest of Kent'; his Socialist opinions brought him into conflict with the religious authorities, by whom he was cast into prison at Maidstone, but was released by the Kentish rebels, only to be recaptured again at Coventry, where he was executed. He may be regarded as the earliest Eng. Socialist, and has been made the subject of a study by William Morris.

BALL, JOHN (1585–1640), Eng. Puritan preacher; ed. St. Mary's Hall, Oxford; was for some time a tutor in Cheshire, afterwards holding a curacy at

BALL

Whitmore (Staff.), of which he was deprived because of his opinions. He pub. *Treatise of Faith* (1632), *A Short Catechisme* (many editions), and other works of the kind.

BALL, HENRY PRICE (1868); engineer; b. Philadelphia; educated University of Pennsylvania; m. Anna Crosby Dally, 1891. With United Edison Manufacturing Co., 1888-1893, when he designed and patented many inventions relating to electricity; went to Ward-Leonard Electric Co., 1893-1900 and designed and patented complete line of reostat theatre dimmers and circuit breakers for control of electric current; chief engineer General Incandescent and Arc Light Co., where he designed and patented further inventions relating to electrical appliances, etc. Consulting engineer General Electric Co.; superintendent Lalande and Grosjean Co., Woodhaven, L. I., since June, 1917.

BALL, JOHN THOMAS (1815-98), Irish lawyer and historian; M.P. for Dublin Univ. (1868); successively solicitor-general, attorney-general, and lord chancellor of Ireland; author of *The Reformed Church of Ireland* (1886).

BALL, SIR ROBERT STAWELL (1840-1913), Eng. astronomer; Lown-dean prof. of Astronomy and Geometry, Cambridge, and author of popular astronomical works.

BALL, THOMAS (1819-1911), Amer. sculptor; executed statues of Washington at Boston, Daniel Webster at New York, Edwin Forrest as 'Cortolanus' at Philadelphia, and many others which have brought him considerable fame.

BALLAD, originally a song accompanying a dance (from O. Fr. *ballet*, to dance), now used in reference to a narrative poem in simple rhymed metre, most commonly in eight- and six-syllable measure, as thus:—

'John Gilpin was a citizen,
Of famous London town.

B's and folk-songs form part of the lit. of all European countries, and often the same story will be found in various languages. Some of the most beautiful of Eng. and Scot. traditional ballads are of very early date, and have undergone a process of alteration at the hands of many generations of minstrels. Bp. Percy and Sir Walter Scott did much to preserve old ballad lit. Percy's *Reliques* appeared in 1765, and the first vol. of Scott's *Border Minstrelsy* in 1802.

BALLADE. Old Fr. form of verse consisting of three stanzas and an envoi, and containing not more than three or

BALL BEARINGS

four rhymes. It came into vogue during reign of Charles V., and was very successfully employed at different periods by Alain Chartier, Henry Baude, François Villon, Clément Marot, and Théodore de Banville. The *ballade* form has been used in England by Chaucer, Gower, Lydgate, and amongst later writers by Swinburne, Austin Dobson, and Andrew Lang.

BALLANTINE, JAMES (1808-77); Scot. artist and author; did much for modern art of staining glass; carried out staining of windows of House of Lords.

BALLANTINE, WILLIAM (1812-87). Eng. serjeant-at-law; famous for prosecution of Franz Müller (1864), and his defence of the Tichborne claimant (1871). Was a conspicuous figure in the literary and theatrical circles of his day.

BALLANTRAE (55° 6' N., 5° W.); fishing village, Ayrshire, Scotland.

BALLANTYNE, JAMES (1772-1833); Scot. publisher; produced Scott's *Border Minstrelsy*, 1802; removed to Edinburgh, and with his bro. John (1774-1821), established firm of B. & Co., in which Scott had half the shares; final bankruptcy, 1826.

BALLANTYNE, JAMES ROBERT (d. 1864), Oriental scholar; librarian to India Office; produced many translations from Sanskrit; famous for *Practical Oriental Interpreter* (1843).

BALLANTYNE, ROBERT MICHAEL (1825-94), Scot. novelist; b. Edinburgh; six years in service of Hudson Bay Company; on his return pub. *Hudson's Bay, or Life in the Wilds of North America*; entered Constable's publishing firm, but in 1856 adopted lit. as profession, and produced about 80 books for boys.

BALLARAT, and **BALLARAT EAST** (37° 34' S., 143° 53' E.), city, Victoria, Australia, next in importance to Melbourne; intersected by Yarrowee Creek; lies in center of one of the richest gold-fields in the world; largest nugget ever found (the 'Welcome') was found at B.; district suitable for sheep-breeding; industries, gold-mining, iron-founding, brewing; railway center. Pop. 42,500.

BALLAST, heavy material placed in hold of ship for stability; sand carried in balloon, and thrown out to ensure rising; gravel on slag bed for railway track.

BALL BEARINGS. Ball bearings are bearings in which the journal or revolving part turns upon hardened polished steel balls, which roll in polished steel grooves called races. One of these is fastened to the shaft, the other to the

BALLENSTEDT

bearing housing. One or more rows of balls may be used, depending on the load the bearing is required to carry. In many of the higher grade bearings, the balls fit loosely in a skeleton cage of bronze or pressed steel, called a ball retainer, whose function is to keep the balls from touching each other. Races of concave section give the best results and are usually used, although some bearings employ plane races. Bearings with concave races may be so designed as to permit considerable angular displacement between the planes of the inner and outer races. When so constructed they are called self aligning.

Bearings with concave races will act to a considerable extent as thrust bearings, and it is general practice in cases where a shaft is supported by two or more bearings, to clamp the outer race of one, thus constraining it in a longitudinal direction, while the outer races of the other bearings are left free to slide in their housings. This takes care of any expansion of the shaft, without allowing it a large amount of endplay. Ball bearings have the advantage over ordinary journal bearings in that rolling friction is substituted for sliding friction, thus less power is used in such a bearing than in an equivalent journal bearing, even under optimal conditions (*i.e.*) when the oil film between the parts is intact.

BALLENSTEDT, town, Anhalt, Germany (51° 43' N., 11° 14' E.), near Harz Mts.; argentiferous lead, iron ore, and pyrites are mined. Pop. 6,000.

BALLET (Fr. *ballet*, Ital. *baletto*, to dance), theatrical entertainment consisting of artistic dancing, posturing, and pantomimic action. Such performances were popular with the Greeks and Romans, and from early times the b. flourished throughout Italy—a notable performance of the kind being that given at Tortona to celebrate the marriage of the Duke of Milan in 1489. The b. was introduced into France by Catherine de' Medici, who wished to divert the attention of her s. (Henry III.) from State affairs. Henry IV., Louis XIII. and XIV., and Cardinal Richelieu all spent lavish sums on these entertainments, the three kings being themselves frequent performers in them. Women did not appear in b's until 1681, when four lady dancers took part in *Le Triomphe de l'Amour*. The earliest b. performed in London was *The Tavern Bilkers*, at Drury Lane, 1702. The word 'balette' was first used in English by Dryden in 1667.

BALLIA (25° 44' N., 84° 11' E.), district and town, Benares, United Pro-

BALLON D'ALSACE

vinces, India; rice, sugar-cane; area of dist., 1,245 sq. miles. Pop. 1,000,000.

BALLIN, ALBERT (1857–1918), Ger. commercial magnate, friend and adviser of the ex-Kaiser William, of Jewish descent; founded the Hamburg-America line; pioneer of the modern 'floating palace.' On eve of outbreak of war he wrote to the *Times* seeking to influence Brit. public opinion against participation (not published until April 1915); also wrote to Lord Haldane; said to have been opposed to ruthless submarine campaign; committed suicide on the day before the Armistice (Nov. 11, 1918).

BALLIN, HUGO (1879), artist; b. New York. He studied art in New York, Rome and Florence. Awarded scholarship Art Students' League; Shaw Prize Fund, 1905; Thomas B. Clarke Prize, 1906, and various other prizes and medals. Has had work reproduced in *Critic*, *Century*, *Kunst* and *Kunstlerwerke* (Vienna), *International Studio*, etc. Works include executive chamber, Madison, Wis.; room in home of Oliver Gould Jennings, New York City, and of E. D. Brandegee of Boston; decorative pictures in several private collections; work also represented in many museums in America. Director and art director Goldwyn Pictures Corporation.

BALLINGER, RICHARD ACHILLES (1858–1922), ex-Secretary of the Interior; b. Boonesboro, Ia. He was educated at the University of Kansas and Washburn College, Topeka; A.B., Williams College, Mass. Admitted to the bar 1886; practiced at Kankakee, Ill., New Decatur, Ala., Port Townsend, Wash., and Seattle. U.S. court commr. 1890–2; judge superior court, Jefferson co., Wash., 1894–7; mayor of Seattle, 1904–6; Sec. of the Interior in Taft's cabinet 1909–11. Until death in 1922, practised law at Seattle, Wash.

BALLIOL COLLEGE. See **OXFORD** (University).

BALLISTA, BALISTA, Rom. engine of warfare, which utilized principle of cross-bow to hurl missiles.

BALLISTICS, science treating of projectiles.

BALLISTITE, explosive, used as propellant and also for demolition; said to be the smokeless powder chiefly used by the Italians; invented by Nobel (1888); later process by Lundholm and Sayers; consists of nitrocellulose and nitroglycerine with or without the addition of other materials; great heat evolved in injures rifling of the gun.

BALLON D'ALSACE, height at ex-

BALLON SONDE

trems S. of Vosges Mts. (47° 50' N., 6° 51' E.); an outlying defence on N. of Belfort (15 m.); first position captured in Fr. invasion of Alsace-Lorraine (Aug. 10-15, 1914).

BALLON SONDE, small balloon inflated with hydrogen used for carrying self-recording instruments into the upper air. Alts. of 12 m. are not uncommon (highest alt. attained 23½ m., Pavia, 1912).

BALLOON, a bag made of light and strong material—(e.g.) silk—and filled with a gas so as to rise and float in the air, which it does when the weight of the whole is less than the weight of an equal volume of air. In mediæval times various suggestions were made by philosophers and others to enable metal spheres and other vessels to float in the air; but the first balloon was invented in 1782 by the brothers Joseph and Jacques Montgolfier, papermakers at Annonay, near Lyons, who inflated a paper bag over a fire with smoke so that it ascended into the air. They reproduced this experiment on a larger scale, and were imitated in Paris by Charles and the brothers Robert in 1783, who, however, substituted hydrogen gas as an inflating agent. In that year the Montgolfiers carried out their famous experiment before the king and queen at Versailles, sending up a large decorated balloon inflated with smoke and heated air (it was later ascertained that not the smoke, as the Montgolfiers supposed, but the lighter heated air was the agent that enabled their balloons to rise), to which was attached a cage carrying a cock, a duck, and a sheep, which were found to be uninjured when the balloon descended.

In 1783, also, the first human being, de Rozier, ascended in a captive, and later in a free, fire-balloon; while only a few days later Charles, who invented the valve, netting, and other accessories, ascended in a balloon inflated with hydrogen. The first person in Britain to rise in a balloon was Tytler, who ascended at Comely Gardens, Edinburgh, in 1784, in a fire-balloon constructed by himself, some days before the first ascent by the well-known Lunardi, at London. In 1785 the English Channel was first crossed in a balloon by Blanchard and Jeffries, and in 1836 another famous balloon voyage was made by Holland, Mason, and Green, from London to Wellburg, in Nassau, about 500 m., in 18 hours. In 1912 Bienaimé made a voyage in a balloon from Stuttgart, Germany, to near Moscow, Russia, a distance of nearly 1,362 m.

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BALLOT REFORM

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From beginning of 19th cent. down to Franco-Prussian War (1870-1) balloons were used for making reconnaissances in war; in Franco-Prussian War for keeping up communication between Paris and the provinces. These services are now performed by dirigible balloons and aeroplanes. Captive Balloons are employed for directing the fire of artillery. For later developments see **DIRIGIBLES** under **AERONAUTICS**.

BALLOT (Ital. *ballotta*, 'a small ball') signifies device for secret voting, the name originating in Gr. practice of voting by ball, the white or unplucked ball dropped into voters' box showing approbation, the black ball denoting disapproval—what we still call 'black-balling.' The Romans adopted a similar system, 2nd cent. B.C., but voted on pieces of wood. The idea has been adopted for elections by modern democracies; used in New England states from 1775; agitation for its use commenced in England with general agitation for parliamentary reform at beginning of 19th cent.; definitely adopted as part of liberal programme (1831). France (1852), Italy (1861), and Brit. colonies (Australia, 1856) set the example; Eng. Ballot Act (1872), drawn up by W. E. Forster on Australian model, enforces voting by ballot in parliamentary and municipal elections. Names of candidates are printed in alphabetical order on a stamped paper; voter puts X against name he approves, folds paper, and drops it into locked sealed box.

The *Second Ballot* is employed—or advocated—where the candidate at top of poll in a three or more cornered election has not been returned by more than half the total votes; in the second election the two top candidates of first ballot alone present themselves.

BALLOT REFORM, a movement arising from the abuses of the 'party ballot,' which built up the great American political organizations and which has been a fertile means of corrupting, defrauding and intimidating the individual voter. Chief among the present demands of electoral reforms is a ballot which enables a voter to record his choice of candidates independent of

party lines. The increasing extension of the electoral franchise, such as in woman's suffrage, initiative and referendum on public issues, presidential primaries and the popular election of senators, is allied with the subject. The greater the widening of appeals to the voters at large, the more imperative becomes an effective ballot system. There is a confusing diversity in the ballots adopted by various states. Most of them use the Australian ballot, so called because it was first employed in some of the provinces of that commonwealth. It is an officially printed ballot, with the names of all the candidates for a given office, whether party or independent nominees, arranged in order, and the voter is required to record his vote by some mark against the name of his chosen candidate, and deposit the sheet in a ballot box without permitting any other person to examine it. The illiterate voter has to be considered, and for his benefit some ballots have the candidates' names arranged in party columns, each column headed by an emblem, such as the Republican, Democratic, or Socialist emblems. Another form of the official ballot is the 'blanket' list of candidates, whose names are ranged in alphabetical order regardless of their political affiliations. The complexity of the long ballot with its thicket of names of all candidates for all offices, national, state and local, to be filled at one election, has developed a demand for simplifying such elections by not holding them all together. Separate elections of candidates to national, state or local offices would permit of the more understandable 'short ballot,' and promote more intelligent voting. The long ballot is such a ponderous document that a voter is tempted to vote the 'straight ticket'—the aim of the politicians in using it—rather than try to pick out the candidates he prefers. The ballot, however, has proved that good government rests fundamentally on the voter's integrity and discernment, rather than on the devices he uses, and he is showing both more and more despite the clumsiness of those devices. Voting machines are growing in use, especially in New York State, where the adoption of such mechanical aids is mandatory in elections in cities of the first class.

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BALLYMENA (54° 52' N., 6° 17' W.), town, County Antrim, Ireland; brown linen. Pop. 11,400.

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BALM. See **BALSAM.**

BALMACEDA, JOSÉ MANUEL (1838–91), Pres. of Chile Republic.

BALMAIN (34° S., 151° E.), town, Cumberland, New South Wales, Australia; sawmills; iron foundries, Pop. 31,000.

BALME, COL DE, famous pass of Rhône Valley between Chamonix and Martigny; height over 7000 ft.; magnificent views.

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BALMER, EDWIN (1883), author; b. Chicago. He graduated from Northwestern University in 1902. On Chicago Tribune, 1903; associated with publication of *The Commons*, 1904–5; formerly editorial adviser and contributor to *Hampton's Mag.*, and contributor to *Collier's Weekly*, *American Magazine*, *Saturday Evening Post*, *Ladies' Home Journal*, *Outlook*, *Illustrated London News*, *Popular Magazine*, *Youth's Companion*, etc. Has traveled in Cuba, Mexico, Europe, Hawaii and Japan. Author: *The Achievements of Luther Trant* (with William MacHarg), *The Science of Advertising*, *The Surakarta* (with William MacHarg), *A Wild Goose Chase*, *The Blind Man's Eyes* (with William MacHarg), *The Indian Drum* (with same). Frederick Thompson's play 'Via Wireless' was based on one of his stories in the *Saturday Evening Post*, and several of his stories have been produced as photoplays.

BALMORAL CASTLE, royal residence, Deeside, Aberdeenshire, Scotland; estate was purchased by Queen Victoria in 1851, and present castle was erected from designs of Prince Consort, 1855.

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BALRAMPUR, town, Oudh, India

BALSAM

(27° 26' N., 82° 16' E.), cotton, blankets, felt, etc. Pop. 16,800.

BALSAM, substance which is a mixture of an oleoresin with benzoic acid or cinnamic acid, or with both; those used in med. are: b. of Peru, b. of Tolu, prepared storax (*Styrax preparatus*) and benzoin—the two former used chiefly in perfumery, and the two latter in ointments for some skin diseases, and together in a tincture as an expectorant; *balm of Gilead* (much prized in the East) and Canada b. (used in microscopic preparations) contain neither benzoic nor cinnamic acid, and should not therefore be included among b's.

BALTA (48° 3' N., 29° 33' E.), town, Podolia, Russia. Pop. 24,000.

BALTCHIK, BALTJIK (43° 25' N., 28° 13' E.), port, Bulgaria. Pop. 5,000.

BALTIC PORT, town and seapt., Russia, at entrance to Gulf of Finland (59° 23' N., 24° E.); terminus of railway line from Petrograd (250 m.).

BALTIC PROVINCES, republics cut out of former Russian empire (53° 30'–59° 36' N., 21°–28° E.). They are Esthonia, on the Gulf of Finland, cap. Reval. Area, 7,800 sq. m.; pop. 500,000. Livonia and Kurland, round Gulf of Riga (may unite as Latavia), chief tn. Riga, area, c. 29,000 sq. m.; pop. 2,750,000. Lithuania, cap. Vilna; League of Nations to decide future of Memel and Tilsit, between Lithuania and Poland. Area, 70,000 sq. m. All are forested, agricultural, and pastoral. See MAPS BALTIC STATES, FINLAND.

BALTIC SEA, or EAST SEA, inland sea, N. Europe (53° 30'–65° 40' N., 10°–30° E.), surrounded by Denmark, Germany, Russia, Finland, and Sweden; connected with North Sea by Sound. Great Belt, Little Belt, Cattegat, Skager Rack, Kaiser Wilhelm canal; in N. is Gulf of Bothnia, in E. Gulf of Finland. Principal islands are: Aaland Islands, belonging to Finland; the Danish islands of Zealand, Fünen, Laaland, and Bornholm; Gotthand and Oland, belonging to Sweden. Length, c. 950 m.; greatest width, c. 150 m.; area, c. 170,000 sq. m.; length of coast line, 5,000 m.; average depth, 20 fathoms, deeper in N. end.; little tide, except at entrance; navigation dangerous; great part frozen in winter. Baltic Sea at Kiel and North Sea at mouth of Elbe were connected by canal (1895). See MAP BALTIC STATES.

BALTIC STATES. See BALTIC PROVINCES.

BALTIMORE

BALTIMORE, the chief city of Maryland. It is on the Patapsco river and is about 14 miles from the Chesapeake Bay. It is on the Baltimore and Ohio, the Pennsylvania, the Western Maryland and other important railroads. Its total area is about 92 sq. miles. The situation of Baltimore in relation to shipping has made it, from its very beginning, an important commercial city and this importance has increased greatly in recent years with the building of many important industrial plants in and near the city. One of the most important of these is the Sparrows Point plant of the Bethlehem Steel Co., which is the largest sidewater steel plant in the world. Baltimore is the distributing and jobbing center for a large area and is one of the largest wholesale distributing points in the United States. It is on the border of the great Maryland, Pennsylvania and West Virginia coal fields. The city has always been famous for its markets, as it is the center of a large agricultural and fruit growing region. In 1923 it ranked third among the U.S. ports in export overseas tonnage, and fifth in imports. Shipbuilding during the World War was one of the most important industries in the city. Its harbor now comprises 127 miles of deep water frontage, 45 miles of which are developed and its piers constructed with a uniform depth of 35 feet provide unusual facilities for loading and unloading cargoes. The United States Government and the city have expended over 21 million dollars for improvements to the approaches of the channel. The wharves which are owned by the city are constructed of concrete. There are many modern grain elevators and a floating dock, one of the largest in the world. The port of Baltimore is served by almost 60 regular steamship services operated by 44 lines which dispatch steamers to more than 100 foreign ports. In addition there are over 20 coastwise lines. Baltimore is unusually rich in public monuments and buildings. From the number of memorials within its borders it is called the Monumental City. These include the Washington Monument, Battle Monument, Francis Scott Key Monument, and the Soldiers and Sailors Monument. The public buildings include a city hall, post office, custom house, Masonic Temple and Johns Hopkins Hospital. There are also many important educational institutions including Johns Hopkins University, St. Mary's Seminary, Goucher College, Peabody Institute, Loyola College, and several colleges for women. There is an unusual efficient public school system and over 100,000 pupils are enrolled. The city has many handsome churches including a Roman Catholic cathedral. Its industries



The Baltic States
ESTHONIA, LATVIA
and
LITHUANIA

SCALE OF MILES
0 10 20
Capitals of Countries.
Elevations in English Feet.
Railroads. Canals.

The World Syndicate Company, Inc., N.Y.

are varied and include the manufacture of clothing, steam rails, fertilizers, structural iron, chemicals, etc. Baltimore was founded in 1729 and for a time grew more rapidly than any other city in America. During the war of 1812 it was attacked by land and water by the British but was successfully defended. During the bombardment of Fort McHenry, Francis Scott Key, who was detained on board a British war vessel, composed 'The Star Spangled Banner.' Baltimore suffered severely from loss of trade during the Civil War but recovered rapidly. In 1904 a great fire destroyed a large part of the city, causing a loss of over \$125,000,000. The burned district was practically rebuilt within three years. Pop. 1920, 733,826; 1923, 773,580.

BALTIMORE, GEORGE CALVERT, 1ST BARON (d. 1632), Eng. statesman; b. Kipling (Yorks); ed. Trinity Coll., Oxford; frequently employed in State affairs by James I.; knighted, 1617; Sec. of State, 1619; cr. Baron B., 1625; was the founder of the Avalon colony in Newfoundland, 1621. His s. Cecilus, 2nd Baron B., was the founder of Maryland.

BALISTAN, or LITTLE TIBET, dist. Kashmir, India (34°-36° N., 75°-77° E.); crossed by Karakoram Mts., which culminate in Mt. Godwin - Austen, over 28,000 ft.; drained by Indus. Cap. Skardo. Pop. c. 50,000.

BALUCHISTAN, or BELUCHISTAN, country, S.W. Asia, between Afghanistan and Arabian Sea (24° 54'-32° 4' N., 60° 56'-70° 15' E.). Coast-line extends about 600 m., but there are no good harbors. Considerable portion is under Brit. control, called *British Baluchistan*, in N.E.; whole is within Brit. sphere of influence. Surface generally consists of dry tablelands, but there are low lying plains in E. Principal mountains are Sulaiman system in N., Kirthar range in E., Pab Hills in S., Makran coast range in S. Chief rivers, Nari, Bolan, Badra, in E.; chief town, Kalat. Climate has extremes of cold and heat; rainfall slight.

Fruit, cereals, and potatoes are grown; camels, horses, oxen, and cows kept. Minerals include coal, iron, lead, asbestos, chromite, salt, but are little worked. There are few manufactures: needlework, felts, pottery, etc.; exports dates, dried fish, etc.

Early history of Baluchistan is veiled in obscurity; ruled by Hindu rajahs till 17th cent. when last rajah applied for aid to Kambar, chief of mountain tribe, who eventually deposed him and established Mohammedan religion. In follow-

ing cent. Nadir Shah established Pers. influence in country, and appointed as ruler Nasir Khan in 1739. In 1839, Kalat was attacked and captured by British, who, however, evacuated it in 1841, having concluded treaty of friendship. Other treaties were concluded on two subsequent occasions, and British Baluchistan was established in 1887.

British Baluchistan and the political agencies of Quetta, Pishin, Zhob, Loralai, Bolan Pass, Sibi, and Chagai are directly governed by chief commissioner, who also, as gov.-gen.'s agent, supervises administration of remainder of country, comprising native states of Kalat and Las Bela, and tribal areas.

Inhabitants are chiefly of Pathan, Brahmin, and Baluch races; Pathans found in directly administered districts, Brahmins in middle, Baluchs in S.; there are also Lasis, Saiads, Chuttas, and other races, including Persians. Islam is principal religion, but there are some Hindus. Area, 134,638 sq. m.; pop. 834,700. See MAP CENTRAL AND S. ASIA.

BALUE, JEAN LA (1421-91), Fr. cardinal; almoner to Louis XI., who obtained cardinalate for him (1468); as crafty and treacherous as his master, after whose humiliation by Charles the Bold he entered into an intrigue with the Burgundian; was discovered, and suffered eleven years' imprisonment in an iron cage. After release, he lived in high favor at Rome.

BALUSTER, a small circular pilastr of Ital. invention, supporting a hand-rail, coping, balcony, or terrace. A row of balusters forms a *balustrade*.

BALUZE, ÉTIENNE (1630-1718), Fr. scholar; pub. *Capitularia Regum Francorum* (1674); *Nova Collectio Conciliorum* (1677); *Letters of Pope Innocent III.* (1682); *Vitae Paparum Avenionensium, 1305-94* (1693).

BALZAC, HONORÉ DE (1799-1850), Fr. novelist; b. Tours; ed. Collège de Vendôme and Sorbonne; intended by his f. for the law, Honoré had other intentions, and went to Paris (1819) to seek his fortune as an author. Here for ten years he struggled, achieving no success. It was not until he was thirty that he made a reputation with his *Les Derniers Chouans*, followed by *La Peau de Chagrin* and other novels. Then he conceived the idea of presenting, under the general title of the *Comédie Humaine*, a large series of novels which should give a complete panorama of modern life, including men and women of every rank and occupation. With this purpose in view, B. produced in rapid succession

La Recherche de l' Absolu, Le Pere Goriot, Les Illusions Perdus, etc. He wrote some eighty novels in twenty years, working sometimes eighteen hours daily, yet he was involved in debt to the end of his days. Criticism has raged round B.'s writings, and, despite his unique position, he is far from receiving unmixed eulogy from important critics. Many of his books are devoted to the emotions of trivial people, and the excitements and ideals of the drawing-room, and the wit which makes such things acceptable is lacking; though that B. had a genuine, if not subtle, sense of humor is shown by the *Contes drolatiques*. He is at his lightest and happiest in sketching tragedies of the common people like *Le Pere Goriot*; he sought force rather than felicity of wording.

BAMANGWATO, native dist. and people, Bechuanaland Protectorate; country extends E. as far as Macioutsie R., and across it to confluence of Shashi and Tuli; cap. Serowe, 40 m. W. of ry. line at Palapye Road; tribe, under the chief Khama, number about 35,000.

BAMBERG, town, Bavaria (49° 54' N., 10° 52' E.); Romanesque cathedral (1004), contains tomb of founder, Henry II.; manufactures cottons, rope, tobacco; famous market gardens in vicinity. Pop. 48,000.

BAMBINO, name for representations of the infant Christ in swaddling clothes; especially figure preserved in Rome, believed to work miracles.

BAMBOO (Bambuseae), tribe of grasses, often tree-like (120 ft. high), growing in tropics, but spreading to sub-tropical and temperate zones; cultivation possible even to snow-line of Himalayas and Andes. The twenty-three genera are put to multifarious uses; succulent shoots and fruits for food; stems for buildings, masts, cooking vessels, writing-reeds, weapons; strips of outer cuticle are excellent material for basket-making and other wicker-work; in China, internal portions pulped for paper manufacture.

BAMBUK, hilly dist., W. Africa (13°-14° 30' N., 11°-12° W.); cattle raising; gold, iron, ivory, fruits; climate unhealthy; under Fr. protection (1858). Mandingo pop. (est.) 800,000.

BAMBURGH, or **BAMBOROUGH**, vil., Northumberland, England (55° 37' N., 1° 43' W.); once Saxon royal burgh; popular resort; burial-place of Grace Darling; castle, founded by Ida about 547, stands on Whin Sill; fortress in mediæval wars; now private residence of Baron Armstrong.

BAMPTON, JOHN (1689-1751), Eng.

theologian; founder of Bampton Lectures in Oxford, defending Christianity.

BAMRA, native state, Bengal, India (21° 40' N., 84° 40' E.); timber, rice. Area, 1,988 sq. m.; pop. 125,000.

BAN, Pers. title, meaning 'lord' or 'master,' brought into Europe by the Avars; later it meant 'to proclaim,' 'to announce'; in Fr. it is the name of the section of the population first liable for military service, while *arriere-ban* means the reserve; by Shakespeare, Milton, and other Eng. writers it is used in the sense of 'to forbid'; it retains its earlier meaning of 'to proclaim' in 'banns of marriage.'

BANAM, town, Cambodia (11° 16' N., 105° 21' E.); cap. of Banam prov. Pop. c. 20,000.

BANANA (*Musa*), tropical, perennial herbaceous plant; about 40 species, cultivated for food; *M. corniculata* produces a single fruit requiring cooking; leaves are used for packing, plaiting mats, etc. Manila hemp is prepared from *M. textilis*; b. is native of tropics of Old World, but is now distributed throughout the hot regions of America; large quantities exported from West Indies and Canaries; b. closely allied to the plantain; latter more farinaceous than b., and is generally cooked.

BANANA.—(1) (8° 8' N., 13° 6' W.); volcanic island, Sierra Leone, Africa. (2) (6° S., 12° 17' E.), seaport, Belgian Congo, Africa; exports rubber, palm oil, ivory.

BANANA OIL. Amyl Acetate, OH , $\text{CO}_2\text{C}_4\text{H}_{11}$. A colorless liquid having a very penetrating odor, somewhat resembling bananas. Specific gravity 0.866, boiling point 148°C. It is prepared by the addition of acetic acid to amyl alcohol in the presence of sulphuric acid, the oil being distilled from the mixture. It is very slightly soluble in water, soluble in alcohol, and is readily inflammable. It has many industrial uses, among the most important being its solvent action on nitro-cellulose, in the preparation of lacquers, metallic paints, varnishes and coatings for artificial leather. It is also used as a flavoring agent and in perfumery.

BANAT, popular name for Temesvar dist. (45° 35' N., 21° 30' E.); fertile; wheat, wine, minerals, silk. Area, 11,260 sq. m.; divided by Peace Conference between Jugo-Slavia and Rumania. Pop. c. 1,500,000.

BANBURY (52° 4' N., 1° 19' W.), market town, Oxfordshire, England; incorporated by Queen Mary (1553);

ancient cross, noted in nursery rhyme, destroyed by Puritans, 1610; famous cakes; rope, leather. Pop. 13,500.

BANCROFT, GEORGE (1800-91), Amer. historian; b. Worcester (Mass.); ed. at Harvard and several Ger. univ's; for a time Sec. of the Navy, and Sec. of War, and minister to Great Britain (1846-49); associated with Goethe, Humboldt, Macaulay, and Hallam. He was the author of a monumental *History of the United States*, which began to appear in 1834.

BANCROFT, HUBERT HOWE (1832-1918), historian; b. Granville, O. Entered book store Buffalo, N.Y., 1848, and established publishing house at San Francisco, 1856; began collecting Pacific Coast historical data, in 1858, which, when presented to the University of California, formed 60,000 volumes. Author: *West American History Series in 39 volumes, Chronicles of the Builders of the Commonwealth, Resources of Mexico, The Book of the Fair, The New Pacific, Some Cities and San Francisco, The Book of Wealth, Retrospection, Personal and Political.*

BANCROFT, RICHARD (1544-1610), Archbishop of Canterbury; supported the royal power against the civil courts; was a vigorous opponent of schismatics.

BANCROFTS, THE, husband and wife, Eng. actors; inaugurated the natural school of acting by their productions of the Robertson comedies, *Society, Ours, Caste*, etc., in old Prince of Wales' Theatre, London; in 1880 they took the Haymarket Theatre, and produced several successful plays; retired 1885. Sir Squire Bancroft (1841), knighted in 1897, married Miss Effie Wilton (Lady Bancroft). She died in 1921.

BANDA (25° 26' N., 80° 25' E.), capital and district, Allahabad, India; area, 3061 sq. miles; barren; trade in cotton; produces millet, rice. Pop. 631,058.

BANDA ISLANDS (40° 30' S., 130° E.), group of Molucca islands, Dutch East Indies; chief town, Nassau, in Banda Neira; frequent earthquakes, volcanoes; nutmegs, sago. Pop. 9,000.

BANDA ORIENTAL, old name for Uruguay. (q.v.).

BANDELIER, ADOLPH FRANCIS ALPHONSE (1840-1914), Swiss-Amer. archaeologist; emigrated to U.S.A. as a youth, and made a special study of Inca civilization.

BANDELLO, MATTEO (1480-1562), Ital. novelist; wrote a collection of *Novella* (1554-73) in the manner of

Boccaccio's *Decameron*, which served as a quarry for the Eng. Elizabethan dramatists. Shakespeare derived several of his plots from B.

BANDER ABBASI, BANDER ABBAS (27° 13' N., 56° 23' E.), seaport town, Persian Gulf, Kerman province, Persia; formerly called *Gombrun*; renamed after Shah Abbas I., who with aid of English drove Portuguese out of Ormuz, 1622, and transferred portion of trade to B.A.; extensive trade with India and Europe; cotton, raisins, indigo. Pop. c. 6,000.

BAND FISHES (*Cepolidae*), 10 species of crimson, small-scaled, 'bony' fishes, inferior as food; the red b. f. (*Cepola rubricens*) is a rare Brit. fish. The rest are widely scattered.

BANDHOLTZ, HARRY HILL (1864), brig.-gen. U.S.A.; b. Constantine, Mich.; graduated U.S. Military Academy, 1890; m. May Cleveland, 1890. Professor military science and tactics, Michigan Agricultural Coll., 1896; served in 7th Inf. during Santiago campaign and with 2nd Inf. in Philippine insurrection campaigns; governor of Tayabas Province, 1902-3, being only regular army officer elected to such position; appointed chief of Philippine Constabulary, 1903; led campaign against Simeon Ola in Albany; transferred to command Dist. of Central Luzon, 1905; brig.-gen. and chief Philippine Constabulary, 1907-13; provost marshal gen. A.E.F., 1918-1919; American rep. on Interallied Mil. Mission to Hungary, 1919; in command Dist. of Washington since Sept. 1, 1921.

BANDICOOT, small marsupials of genus *Perameles*, native of Australia, Tasmania, New Guinea, and some adjacent islands.

BANDICOOT-RAT (*Nesocia bandicota*), Asiatic, especially Ind. and Cingalese rodent, an aberrant form of b. with long hind feet.

BANDIERA, ATTILIO and EMILIO (d. 1844), Ital. patriots; sons of an Austrian admiral; were associated with Giuseppe Mazzini and others in the cause of Ital. liberation. They were betrayed by one of their party, and executed.

BANDINELLI, BARTOLOMMEO, BACCIO (1493-1560), Ital. sculptor; vainly vied with Michael Angelo; some of his best work is to be found in the Cathedral of Florence.

BANDS, two linen strips at front of neck, worn by R.C. priests, Lutheran, Presbyterian, and other 'Reformed' ministers, and as legal and academic badge.

BANDS

BANDS, organized bodies of musicians, using fundamentally brass wind instruments and drums, or stringed instruments and tympani. *Military* 'brass bands' are comparatively modern; bands made up of drums, cymbals, etc., a Turkish institution; Prussian bandmasters supplemented the fifes and drums commonly used by the addition of other instruments, and improved the music. The practice spread to other armies; Duke of York introduced the first complete military band for the Coldstream Guards; Napoleon provided bands for the Imperial Guard and other regiments, and these played during the charge. In early years of 19th cent. other regiments began to follow the example.

BANDUONG, cap. of residency of the Preanger, Dutch E. Indies (6° 57' S., 107° 36' E.); alt. 2,300 ft. Pop. 47,400 (Europeans, 2,200).

BANER, JOHAN (1596-1641), Swed. general; principal military leader under Gustavus Adolphus; invaded Bohemia, and won a complete victory over the Saxons at *Chemnitz*.

BANFF.—(1) (57° 40' N., 2° 32' W.), royal and parliamentary burgh, seaport, and county town, mouth of Deveron, Banffshire, Scotland; of great antiquity; fishing, agriculture; woollens, Pop. 1911, 3,800. (2) (51° 15' N., 115° 38' W.), town, Alberta, Canada; thermal sulphurous springs.

BANFFSHIRE (57° 28' N., 3° 4' W.), county, N.E. Scotland; between Elgin, Inverness, and Aberdeen; area, c. 631 sq. miles; agriculture important; oats, barley, wheat grown, cattle raised; industries include distilling, fisheries; granite, slate, etc., quarried; surface hilly in S., low-lying in N.; well wooded; drained by Spey, Deveron, Avon, Livet; chief mountains, Ben Macdui, Cairngorm; capital, Banff. Pop. 61,400.

BANFFY, DESIDERIUS (1843-1911), Hungarian premier (1895-99); forced to resign through violence of opposition; leader of New Party, 1905.

BANG, HERMANN JOACHIM (1858), Dan. novelist; pub. *Fædra* (1883), *Tine* (1889), and other novels, also poems and miscellaneous works.

BANGALA, town and administrative district, Belgian Congo, Africa.

BANGALORE, city, cap. of Mysore, India (12° 57' N., 77° 35' E.), stands in the midst of the Mysore tableland (alt. 4,000 ft.); consists of native city (2½ sq. m. in area) and Brit. 'assignment' (12½ sq. m.); the latter forming the

BANGOR

largest military cantonment in S. India; climate healthy.

BANGOR.—(1) (54° 39' N., 5° 40' W.) small seaport and watering-place, County Down, Ireland. Pop. 6,000. (2) (53° 13' N., 4° 7' W.) seaport, city, and market town, Carnarvonshire, Wales; holiday resort, Univ. Coll. of N. Wales and Normal Training Coll.; Cathedral (founded, c. 525); slate quarries. Pop. 11,240.

BANGOR, the leading city of eastern Maine, port of entry and county seat of Penobscot co. It stands on the W. bank of the Penobscot River, 137 miles N.W. of Portland and 246 miles from Boston. Its location at the head of navigation on the largest river of the State and the service given it by the Boston and Maine and several other railroads that radiate from it in all directions have contributed largely to its growth and commercial importance. Its harbor is easily accessible and the depth of water is sufficient for the largest of ocean steamships. Its manufacturing establishments exceed 300, and its industries are diversified, though lumber and wood pulp have a preeminent place. There are three national banks, two savings banks, two trust companies; two daily papers and several periodical publications. The assessed property valuation is \$24,000,000. It has numerous handsome public buildings, schools, churches and libraries. The Bangor Theological Seminary is its most noted educational institution. Bangor's first settler came there in 1769 from Massachusetts. In 1834 the town received its city charter. Population, 25,978.

BANGOR, a borough in Northampton co., Pennsylvania, 15 miles N. of Easton and 45 miles S.E. of Scranton, on the Lehigh, Lackawanna and New Jersey Central railroads. It has extensive slate quarries, together with machine shops and silk mills. Its settlement dates back to 1760. It was incorporated in 1875. It is governed by a burgess and a unicameral council. Pop. 5,402.

BANGOR THEOLOGICAL SEMINARY, a Congregational Institution in Bangor, Me., one of the oldest and best known of its kind in New England. It was founded in 1811 and chartered the following year by the State of Massachusetts, of which Maine then formed a part. Though closely connected with the Congregationalists, a considerable number of its students belong to other denominations. The course of study is three years and this is supplemented by courses of lectures given by men of nation-wide reputation. Its real estate is valued at over \$100,000 and its endow-

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ment fund exceeds \$300,000. It has graduated more than 1,000 and given partial instruction to many more. The faculty comprises 7 members.

BANGS, JOHN KENDRICK (1862-1922), an American author. Graduated Columbia in 1883. Became assistant editor of *Life*, in 1884; editor of the *Drawer* from 1888 to 1899; editor of *Harpers Weekly* to 1900; *Metropolitan Magazine*, 1902-3; *Puck*, 1904-5. He was a prolific writer of both fiction and for the stage. Among his better known works are: *Catharine* (1887); *New Wagon of Old Tales* (1888); *Half Hours with Jimmy Boy* (1892); *Coffee and Reptee* (1899); *The Water Ghost* (1893); *The Idiot* (1895); *Houseboat on the Styx* (1895); *Ghosts I have Met* (1898); *Cobwebs from a Library Corner* (1899); *Olympian Nights* (1892); *Molly and the Unwise Man* (1892); *Invention of the Idiot* (1907); *The Real Thing* (1909); *Echoes of Cheer* (1912); *Foothills of Parnassus* (1914); *Half Hours with the Idiot* (1917); *Cheery Way* (1919). He also wrote a musical comedy, *Lady Teazle*, and a musical fantasy, *Tomorrowland*.

BANGWEULU, BANGWEOLO (12° S., 30° E.), lake, Brit. Central Africa; discovered by Livingstone, 1868; area variable; in dry season, 1670 miles; forms headwaters of Congo.

BANIAN (Sanskrit *vanij*, merchant), member of Hindu trading caste; to be found in all large towns of Asia and many commercial centers of Africa.

BANIM, JOHN (1798-1842), Irish novelist; wrote *Tales of the O'Hara Family* (1825), 2nd series (1826); assisted by his bro. Michael (1796-1874).

BANISHMENT, legal penalty which consists in segregation of the offender from the community. It was frequently inflicted in Greece and Rome, in preference to the death sentence, and it was probably as a classical punishment that Sir Thomas More advocated its use in his *Utopia*. In England b. was not recognized as a punishment until 1597, when it was adopted as expedient for ridding the country of the sturdy rogues who had baffled economists throughout the century; but death might be escaped by taking sanctuary, renouncing allegiance, and abjuring the land. That the old Borders between England and Scotland continued to be lawless is shown by statute of 1667, permitting Transportation of Criminals of those regions; imprisonment for life was often commuted to transportation until this was abolished by Acts of 1853 and 1857. By an unrepealed statute b. is still

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penalty in Scotland for celebrating clandestine marriages.

BANJALUKA (44° 47' N., 17° 11' E.), town, Bosnia; tobacco. Pop. 14,800.

BANJERMASIN (3° 25' S., 114° 37' E.), town, capital of Dutch Borneo, East Indies; spices, gold. Sultanate of B. ended 1857. Pop. 50,000.

BANJO, musical instrument, popular in U.S.A., consisting of a long wooden neck, bearing a metal or wooden hoop for body, over which is stretched a sheet of vellum, and having from five to nine strings. Apparently of African origin, for similar instruments, with grass strings, are still used on the Guinea coast.

BANKA.—(1) Isl., Dutch E. Indies (2° 18' S., 106° E.); narrow, hilly; tin, fishing. Area, 4,460 sq. m.; pop. 200,000. (2) Tn., Formosa (25° 6' N., 121° 26' E.); tea, camphor. Pop. c. 50,000.

BANKHEAD, JOHN HOLLINS (1842-1920), senator; b. at Moscow (now Sulligent) Marion, (now Larmar) co., Ala., in 16th Ala. Vols., C.S. Army and wounded 3 times; member of Ala. House of representatives 1856-7, 1880-1; Senate 1876-7; member of 50th to 60th congresses, 6th Alabama District; elected alternate U.S. senator, 1906; appointed and elected 1907 U.S. senator to succeed late John T. Morgan, for term expiring 1913. Has worked in Congress on Commissions on Public Buildings and on Rivers and Harbors; author of the law for Federal Aid to post roads. Died March 1, 1920.

BANKING SYSTEM, UNITED STATES. See **BANKS, AMERICAN**.

BANKOK OR BANGKOK, capital of Siam, on Menam river. Built partly on rafts; many temples. Area 10 sq. m. Pop. about 650,000.

BANKS. A crude system of banking appears to have existed amongst the ancients several centuries before Christ, while among the later Greeks and Romans the regulation of banks was established upon a well-defined basis. These early banks received money, sometimes, but not always, at interest, and repaid it at their customer's written order, or at a stipulated time, charging a commission like all modern banks. But banking, as it is now understood, first came into existence in 1157, when the Bank of Venice was established. Other early banking establishments were the Bank of Barcelona (1401), the Bank of Genoa (1407), the Bank of Amsterdam (1609), the Bank of Hamburg (1619), and the Bank of Stockholm (1688). The Amsterdam Bank,

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during the century following its foundation, became the world's central depository.

The foundation of the Bank of England in 1694 was due to a Scotsman, William Paterson, who was also the promoter of the Darien Scheme. For a long period the London goldsmiths had changed foreign money and lent at interest. James I., Charles I., and Charles II. borrowed from the goldsmiths, and the account of James I.'s relations with George Heriot, in Scott's *Fortunes of Nigel*, is familiar. The Bank of Scotland was established in 1695. These banks secured the privilege of issuing notes, being the first banks to issue paper on their own credit. The Bank of Ireland was established in 1783. Cheques were first issued in England in 1781.

The U.S. National Banking System arose out of the large credit issues of the Civil War. National banks are controlled by Treasury. Cities of over 6,000 inhabitants may have no National bank with less than \$100,000 capital, and this varies to \$25,000 in cities of less than 3,000; half capital must be paid in before business can commence, and 25 per cent. must be transferred in government bonds to Treasury, which authorizes issue of notes to full par (not exceeding market) value of bonds. County banks must maintain reserve of 15 per cent. of outstanding notes and deposits, three-fifths of which can be redeposited in seventeen large (*reserve*) city banks. Reserve banks must keep 25 per cent. reserve, but half can be in National banks in New York, Chicago and St. Louis.

Bank-note, promissory note issued by a bank, and payable on demand; in England the lowest note is of £5 value; in Scotland and Ireland notes of £1 are issued. In U.S. the lowest note issued by National banks is for \$5, but the government issues them for \$2 and \$1. Bank of England notes are printed in black upon water-marked paper, and are legal tender except in Scotland and Ireland. After once being returned to the bank they are not again put into circulation.

Bank-rate, rate of discount charged by the chief, or state, banks, as opposed to the market rate. In England it is fixed by the Bank of England, and constantly fluctuates according to the scarcity or abundance of money in circulation.

Modern Banks.—According to their function banks are either banks of deposit or banks of issue. A bank of deposit has power to receive money from depositors, but not to issue notes. A bank of issue has the right to receive deposits and issue bank-notes. In Eng-

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land and Wales the right to issue notes is confined chiefly to the Bank of England. The Bank of England is not a state bank, but it is a bank in which state revenue is deposited, and is the agent for the government in raising loans. On account of its peculiar business, other banks have found it convenient to deposit a certain amount of their cash with it, and every bank which is a member of the clearing-house must keep an account at the Bank of England. Apart from these circumstances, the Bank of England is in the same position as all other banks, and conducts its business like other banks. The original capital of the Bank of England was £1,200,000; in 1816 it amounted to £14,553,000, at which figure it has since remained.

Private Banks and Joint-stock Banks.

—The number of private banks is diminishing year by year. They cannot consist of more than ten partners, whose liability is unlimited. With regard to joint-stock banks, the legislation of 1826 prohibited the issue of notes for less than £5 in England and Wales; but it expressly permitted, outside a radius of 65 m. from London, the establishment of joint-stock banks with the right to issue notes; and withheld this right from all banks within the radius, excepting the Bank of England. An Act was passed (1833) permitting joint-stock banks to carry on a deposit business in London.

BANKS, AMERICAN.

Banking in the United States had its real beginning in the Revolutionary War, though long before that event various colonies felt the need of banks and projected schemes for their establishment. As far back as 1686 a company in the colony of Massachusetts Bay received authority to issue bills of credit on the security of real and personal estate. About thirty-six years later the Land Bank in that colony was established and thrived for many years in the face of hostility from governors and councils.

In 1780 the necessity of supporting Washington's army with necessities led to the raising of a considerable sum of money by subscriptions, finally amounting to \$1,500,000 in Pennsylvania currency. The subscribers numbered 92 and formed an association known as the Pennsylvania Bank. The first bank of the republic was thus a war emergency institution organized to facilitate the despatch of supplies. The directors had power to borrow money on the bank's credit and to issue notes bearing six per cent interest. The bank was not established for profit and came to an end in 1784 after rendering great service to the cause.

The next bank, originated by Robert Morris and Alexander Hamilton, was likewise established to aid American independence, but it was a commercial bank, privately capitalized, and under government control and support. It became known as the Bank of North America, and to it Congress turned to preserve the Government's credit from the evils of a depreciated currency. Opened in 1782 on a specie basis, it has continued operations to the present day as a member of the national banking system.

The Bank of the United States came into being in 1791 on a twenty years' charter through the efforts of Hamilton, and lasted till 1809, when Congress ended its existence. The institution was empowered to issue notes, which were receivable for all payments to the United States government. The latter also utilized it as an agent in financial transactions, especially in obtaining loans from it to meet deficits in public revenues. The bank encountered the strongest opposition from Jefferson and his followers. Samuel Girard of Philadelphia purchased the bank's premises and most of its assets including \$5,000,000 in specie, thereupon it was re-established as the Girard Bank, under which name it exists today. The Bank of the United States was not unprofitable; its shareholders received dividends averaging 8 per cent. per annum and \$434 per share on its final winding up.

The second United States Bank, with a capital fixed at \$55,000,000, one-fifth of which was subscribed by the government, with five of its directors appointed by the President, began operations in 1817, also on a twenty years' charter. It had an eventful career, encountering at the outset the worst stage of a parlous financial situation which arose with the suspension of specie payments in 1816 and was culminated in a general crash six years later. The bank was of undoubted service, but its management was assailed and charges of gross irregularities were made against it. Moreover, it became deeply involved in politics. As a result the bank incurred the hostility of President Jackson and could not get its charter renewed. In 1836 the institution secured a charter from the Pennsylvania legislature, but its life as a state institution was brief and calamitous. It was not until the Civil War that American banking organizations acquired the foundation they retain today. See BANKS, NATIONAL.

BANKS, FEDERAL RESERVE. These banks were created by the

Federal Reserve Act of 1913, which displaced the Aldrich-Vreeland currency law. The latter was passed in 1908 as a stop-gap measure enacted after the suspension of specie payments by the banks in 1907, but its provisions for enabling emergency bank notes to be issued in times of stress were not popular with the banks. The object of the Federal Reserve Act was to remedy the defects of the then existing banking system, which lacked proper provision for centralizing, holding and using cash reserves during a financial stringency. It also lacked an elastic bank note currency that could be expanded to meet increased demands for currency, either seasonal or abnormal, or contracted when the emergency passed. The purpose of the act, therefore, was to centralize bank reserves, making them always accessible at the place needed; create an elastic bank credit and note issue; organize an efficient and expeditious exchange and transfer system; and develop a banking system to aid the government's fiscal operations.

To effect these aims the country was divided into twelve districts, in each of which a Federal Reserve bank was established. It created a system which each national bank was required to join as member banks and to subscribe to the capital stock of the Reserve Bank of its district. State chartered institutions could also enter the system by meeting the requirements. A Federal Reserve Board was also created, composed of seven members, to control the Reserve Banks and their note issues. The President appoints five of the members, who hold office for ten years, the other members being the Secretary of the Treasury and the Comptroller of the Currency. The chief functions of the Reserve Banks embrace rediscounting commercial paper on which member banks have made advances to customers, issuing Federal Reserve notes to member banks, and holding the legal reserves of member banks. The Reserve Banks must maintain a reserve of 40% in gold against the notes issued, but can permit its reserve to fall below that percentage, subject to a graduated tax on the deficiency. The reserve notes are a bond-secured currency similar to that of the national banks and issued in the same manner. These notes are designed to replace national bank notes as the latter are optionally retired.

The Reserve Banks function as government depositories and as fiscal agents of the treasury, marketing government securities and buying and selling foreign exchange. They regulate the credit situation by raising or lowering their discount rates, and by a sys-

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tematic apportionment of credit in defining the eligibility of commercial paper for rediscount.

BANKS, NATIONAL. Prior to the Civil War period, American banks then existed, all of them State and private enterprises, lacked regulation by a national law. The national banking system created by Congress through the exigencies of the war definitely placed banking on an organized basis and continued to function until radically changed by the Federal Reserve System (q.v.) established in 1913. The financial emergencies of the war impressed on Congress the imperative need of a homogeneous system that would be safe and national in character, operating alike everywhere in the United States. The new system was an outgrowth of the nation's fiscal plights and of commercial requirements. It preserved all the virtues of the chaotic, heterogeneous system it displaced, and augmented it with others. The national banking system was sanctioned by law in 1863 and modified the following year, but it was so tardy in establishing itself that in 1865 the government provided a tax on the notes of State banks which did not subject their conduct to national supervision. Thereafter the banks' reorganization proceeded rapidly, so that by October, 1866, the number of national banks totaled 1644.

Under the law all national banks were empowered to issue notes on the basis of bonds purchased by them and deposited with the Treasury. Banks with less than \$100,000 could not be organized in cities of more than 6,000 inhabitants; in places under that population they could conduct business on a capital of \$50,000. Half the bank's capital was to be paid in before it could operate, and the remainder subscribed in five months afterwards by monthly installments. Not less than 30% of its capital was required to be invested in United States bonds and transferred to the Treasurer, whereupon he was empowered to issue notes to the banks equal to 90% of the par value, but not to exceed the market value of the bonds deposited. The entire amount of currency the banks could issue under the supervision of the Comptroller of the Currency was limited to \$300,000,000. Country banks had to maintain reserves equal to 15% of their outstanding notes and deposits and reserve city banks 25% half of which could be redeposited in national banks in New York City. The latter became a central reserve city, as Chicago and St. Louis did later. Congress amended the national banking law from time to time without departing

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from its fundamental features. Notable changes were the extension of the national banking system to small communities of less than 3,000 population, where banks could be established with a capital as low as \$25,000, and the placing of note issues on a more liberal basis.

The national banks were invaluable in sustaining the public credit for a long period following the Civil War, when the government was heavily in debt and specie payments remained suspended. The system that consolidated them was not without its defects, chiefly due to its inelasticity during periods of panic and financial stringency. But its currency was an undoubted improvement upon much of the State bank circulation it displaced. The system stimulated a remarkable development in banking, and as discount and deposit banks the institutions it brought together completely won the public confidence. As vital factors in local industrial and commercial development as well as in the growth of national wealth the national banks have long occupied an outstanding place in American financial history. Where the system erred through changing conditions the fault must be laid to the tardiness of Congress in amending the law under which it operated. The Federal Reserve Act of 1913 (See **BANKS, FEDERAL RESERVE**) was a decided legislative achievement, however, for which Congress deserves credit in that it did much to meet present-day banking conditions. In 1922 the banks numbered 8,429, had a capital of \$1,307,216,000, deposits of \$16,320,564,000, total resources of \$20,706,010,000 and reported net earnings (the first six months) of \$188,670,000, which indicated a profit for the year of about \$367,000,000.

BANKS, POSTAL SAVINGS. Such government banks operating through the post office for the encouragement of thrift among the masses have long been established in most large countries. They enable small sums to be saved and earn a small rate of interest, and depositors can draw both principal and interest on demand. In the United States, postal savings banks were created in 1911 under the control of a board of trustees composed of the Postmaster General, the Secretary of the Treasury, and the Attorney-General, with the United States Treasurer as treasurer of the funds deposited. Any person ten years old or over can open an account with a dollar. Sums less than a dollar can be saved by purchasing postal savings cards and stamps at ten cents each. Accounts are limited to \$1,000, exchangeable at the depositor's option for postal savings bonds for that sum or for \$20,

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\$100 and \$500. In 1911 there were 162,697 depositors credited with savings amounting to \$10,614,676. In 1922 the depositors had increased to 12,538,997, or 1,800,000 over those in 1921, and had \$7,181,248,000 to their credit, or \$1,162,000,000 more than in the previous year.

BANKS, SAVINGS. These are banks which serve as depositories for the thrifty wage-earner. Unlike ordinary banks of discount, they have no capital stock and therefore no stockholders. Controlled by life trustees who usually receive no compensation, their constitution and service is cooperative, with the depositors in a sort of partnership with each other, since the profits from the investment of their funds are theirs, and they are liable for losses if any occur. Savings deposits accumulated in these institutions in 1921-22 were tabulated as being \$18,087,492,000 (an increase of \$1,500,000,000 over those of the previous financial year of 1920-21) distributed among 28,957,526 accounts as far as ascertainable, or 2,314,695 more than in the 1920-21 period.

BANKS, STATE. The vicissitudes of banking in the United States became vividly reflected in the history of the State banks. Among the earliest and best were the Bank of New York and the Massachusetts Bank, formed in 1785, whose operation signalized the end of an era of unstable and cheapened currency and the inauguration of a financial system enabling bank notes to be redeemable in specie. During the existence of the two United States Banks controlled by the government (see **BANKS, EARLY AMERICAN**), a considerable number of State institutions arose, which also issued notes, but the government banks, by reason of their larger capital and scope, dominated the entire banking system and regulated the issues of the state banks.

In many states the lack of capital, banking and otherwise, did not prevent the establishment of banks. Many had a mushroom growth. They started operations in some states as purchasers of bonds issued for projected public improvements, which were devised solely in order to have a foundation for issuing the bonds, and the banks would issue notes against the bonds. Banks thus established naturally had a curtailed and disastrous life. In other states sound banking principles were followed. But for a long time state banking was a privileged calling. Charters frequently could only be granted through devious forms of subterfuge, when bribery or favoritism did not play a part. For example, banks obtained charters origin-

ally as trading or other companies, with no indication in the charter that banking was the projected business.

After 1838, however, when free banking was established by law in New York State, the privileged few gradually ceased to monopolize banks. The law accorded all associations of persons complying with its terms the right to establish banks and its principles were virtually followed by the other States in their banking legislation. This freedom to establish banks resulted in their great multiplication especially following the disappearance of the United States Bank, but their operation was accompanied by all the trials and disadvantages, developing at times into serious monetary crises, that attend a loose and unorganized banking system. The country's financial history, in fact, was marked by the gravest misfortunes until its banking organizations were founded on a stable footing. Eventually the growth of state banks like that of national banks, had to be restricted. The states realized the need of checking their formation when projected, for instance, by the professional bank promoter or when there was danger of undue competition, which might have the effect of imperiling the security of banking rivals.

Today the state banks are operated on a system which conforms generally to that of the national banks, and their stability may be said to be just as safeguarded by legislation. They are banks of discount and deposit or commercial banks incorporated by a state. New York has the greatest amount of capital invested in such banks, but they are much more numerous in the western than in the eastern states. They also outnumber the national banks by more than two to one. They can do business on less capital, are free to undertake transactions denied to federal institutions, and they seem to be better adapted to the rural districts.

BANKS ISLAND (14° S.; 168° 30' E.), New Hebrides, Oceanica.

BANKS LAND (73° N.; 121° W.), island, Arctic Ocean, Brit. N. America; named after Sir Joseph Banks.

BANKS, EDGAR JAMES (1866), archaeologist; b. Sunderland, Mass., May 23. He was educated at Amherst, Harvard and Breslau Univs.; American consul at Bagdad, 1897-8; organized in 1899, expedition to excavate Babylonian city of Ur, but Turkish authorities refused permission after two years of waiting; acting professor of ancient history, Robert College, Constantinople; excavated Babylonian ruin, Bismya,

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1903, for University of Chicago, and discovering several thousands of inscribed objects dating back to more than 4000 B.C. Field director of Babylonian expedition and instructor of Turkish and Semitic languages, Univer. of Chicago, 1903-6. Climbed to summit of Mt. Ararat, 1912. Author of numerous works.

BANKS, SIR JOSEPH, BART. (1743-1820), Eng. naturalist; undertook expedition to Newfoundland and Labrador, 1766; fitted out Endeavor expedition and accompanied Captain Cook to Pacific Ocean; Pres. of Royal Soc. (1778-1820).

BANKS, LOUIS ALBERT (1855), clergyman; b. Corvallis, Ore. He was educated at Philomath College and Boston Univ.; entered M.E. ministry, 1879; pastor of Independence Avenue Church, Kansas City, 1909-11; evangelist and Prohibition candidate for Governor of Massachusetts in 1895. Author: *The People's Christ, The White Slaves, The Revival Quiver, Anecdotes and Morals, Common Folks' Religion, The Christ Dream, The Fisherman and His Friends, Seven Times Around Jericho, Hero Tales from Sacred Story, The Christian Gentleman, Unused Rainbows, The Healing of Souls, Capital Stories of Famous Americans, Ammunition for the Final Drive on Booze*, etc.

BANKS, NATHANIEL PRENTISS (1816-94), Amer. politician and soldier; entered Congress and became Speaker; Gov. of Massachusetts, 1857-59; served on the side of the North in Civil War, holding command on the Potomac, in Shenandoah Valley, and elsewhere; captured Port Hudson, 1863.

BANKS, THOMAS (1735-1805), Eng. sculptor; studied in Rome; employed by Empress Catherine for two years at St. Petersburg; elected A.R.A. (1784), R.A. (1785); chief works are statue of Achilles in entrance hall of Burlington House, Shakespeare groups in garden of New Place, Stratford, monuments in Westminster Abbey and St. Paul's Cathedral.

BANKSIA, Australian shrub or tree (sometimes 50 ft. high) of the order *Proteaceae*, with yellow, red, or white umbellate flowers

BANKURA (23° 14' N.; 87° 7' E.), town, Burdwan, Bengal, India; indigo, silk. Pop. 23,000. District area, 2,621 sq. miles. Pop. 1,138,000.

BANN, riv., N. Ireland, rises (54° 10' N., 6° 3' E.) in Mourne Mts., and flows through Lough Neagh to the Atlantic; salmon fisheries; length 90 m.

BANNERET (Fr.); high grade of

BANSWARA

knighthood, dating back to reign of Edward I., conferred upon the field of battle for distinguished service. The last recorded instance of its being conferred was by Charles I., in the case of John Smith, of Edgehill, 1642.

BANNING, KENDALL (1879), writer and editor; b. New York. He was educated at Dartmouth College. Managing and associate editor *System*, 1903-17. Served as officer N. Y. and Ohio N.G.; director division of pictures Com. on Public Information, Washington, 1917. Member Society of Mayflower Descendants and various other patriotic societies. Clubs: The Players, Dutch Treat (New York), Cliff Dwellers (Chicago). Author: *Songs of Love Unending, The Squires Recipes, The Sun Dial, Bypaths in Arcady, Prates, Mon Ami Pirrot*; also *Copy*, a one-act play produced in 1911, etc.

BANNOCKBURN (56° 6' N., 3° 55' W.), village, Stirlingshire, Scotland; scene of Robert the Bruce's great victory over Edward II. of England, June 24, 1314, by which Scot. independence was secured; site marked by Bore Stone in which Bruce planted his standard; carpet, tweed, and woolen factories.

BANNS OF MARRIAGE, public notice in church, thrice repeated, of an impending marriage, which was made a law in Eng. Church by a Westminster Canon of 1200; the Lateran Council of 1215 made the publication of banns compulsory throughout Christendom. In America such a preliminary to marriage is not required. In England the ceremony may be avoided by means of a 'license,' or 'special' license.

BANNU, trans-Indus dist. of N.W. Frontier Province, India (32° 16'-33° 5' N., 70° 23'-1° 16' E.). Inhabitants, chiefly Mohammedan Pathans, who are mostly small-holders; wheat is principal crop. Territory came under Brit. influence (1845-6), and was organized by peaceful methods of Edwardes. Chief tns., Bannu (Edwardesabad) and Lakki. Area, 1,674 sq. m.; pop. 250,000.

BANQUETTE, ledge inside parapet of rampart, on which defenders can mount to shoot down at foe.

BANSHEE (Irish, *bean sídhe*; Gaelic, (*ban síth*), a female goblin common to Celtic myth., but more particularly to the folk-lore of Ireland and the W. of Scotland. Heard at night, 'the Banshee's lonely croon' is believed to herald the death of some member of the family.

BANSWARA (23° 27' N.; 74° 27' E.); state, Rajputana, India; capital, B.

fortress, temples; area, 1,946 sq. miles. Pop. 165,000.

BANTAM.—(1) (6° 7' S., 106° 10' E.), residency forming western extremity, island of Java; majority of inhabitants Sudanesse; rice, coffee. (2) town and seaport, founded by Dutch, 1595; formerly head of residency; unhealthy; gave name to B. fowls.

BANTAYAN, tn. and isl., Visayas group, Philippines (11° 9' N., 123° 44' E.); pearls, mother-of-pearl, tortoise-shell. Pop. of isl. 18,300, of tn. 13,300.

BANTING SYSTEM, method of curing corpulency, proposed by Harvey, but first effectively practiced by William Banting of Kensington (1796-1878).

BANTRY (51° 41' N., 9° 27' W.), seaport town, County Cork, Ireland; fisheries, tweeds; scene of Fr. and Jacobean attempt to land, May 1, 1689 (battle of Bantry Bay). Pop. 3,109.

BANTU ('men'), generic name for the language, with its many dialects, spoken by the native tribes occupying a large part of Africa south of the equator; also applied to tribes themselves

BANVILLE, THÉODORE DE (1823-91), Fr. poet and miscellaneous writer; s. of naval captain; devoted himself from his early years to lit. and journalism; pub. many vol's of verse of high quality, and had several plays produced at the Théâtre Français; a leader of Parnassian school.

BANYAN, (*Ficus bengalensis*), Indian tree of fig genus. '*B. Days*' in Brit. navy meant days when no flesh was received with rations; derived either from b. or from Banian (q.v.) whom sailors might consider types of asceticism.

BANYO, settlement in former Ger. colony of Kamerun, W. Africa (6° 45' N., 11° 40' W.); captured during World War by Brit. forces (Nov. 1915).

BANYUMAS, BANJOEMAS (7° 32' S., 109° 20' E.), town and residency, Java. Pop. of town, 5,302; of residency, 1,270,000.

BANYUWANGI (8° 19' S., 114° 20' E.), port, Java. Pop. 16,200.

BANZAI (= a thousand years), Jap greeting.

BAOBAB, MONKEY BREAD, African tree; one of the largest known; its trunk sometimes measures upwards of 30 ft. in diameter; it produces a fruit and the wood is very soft.

BAPAUME, tn., dep. Pas-de-Calais, France (30° 6' N., 2° 51' E.), 13 m. S. by

E. of Arras, and 15 m. W. by S. of Cambrai, situated in a depression of a ridge which forms the watershed between the Somme and the Scheldt. In the Franco-Prussian War it was the scene of a French success after two days' struggle (Jan. 2-3, 1871), an event that was commemorated by a statue of General Faidherbe. During the World War it was defended by a division of French territorials for a brief period (Aug. 29-30, 1914) during the retreat to the Marne. The town remained in Ger. possession till March 17, 1917, when the Germans were forced to retire as a result of the first battle of the Somme, in which Bapaume was an important strategic objective. The famous clock tower, which told the time to the British when they were still S. of the Ancre, had been blown up, so that it might no longer serve as a landmark. During the great Ger. offensive from Hindenburg Line in the spring of 1918 Bapaume again fell into the enemy's hands (March 24), and was finally recovered by the New Zealanders (Aug. 28). By the autumn of 1918 the ruins had been cleared, wooden huts had been constructed, and a good deal of the devastated land had again been put under cultivation.

BAPTISM, the rite of immersion or sprinkling with water which constitutes admission into the Christian Church. It has parallels in various ancient religions, and was observed in later Judaism in the time of Christ. John the Baptist baptized those who came to him in the Jordan, and from the earliest times b. was essential in the Christian Church, for Jesus Himself was baptized by John. The command to baptize all nations is in Matthew 28:19. The authenticity of the Trinitarian formula has been questioned, as there is some reason for thinking that b. simply into the name of Christ was the primitive custom.

BAPTISTRY (Lat. *baptisterium*), the chapel or building annexed to a church and specially designed for baptism; when baptism was by immersion and only took place three times a year, large b's were necessary; famous examples at Florence, Pisa, Asti, etc.

BAPTISTE, NICOLAS ANSELME (1761-1835), Fr. actor; member of a family all the members of which achieved success on the stage

BAPTISTS, a Christian denomination originating in England about 1612, when the first Baptist church was organized in London. Other churches of the new sect sprang up, and from the movement arose the group known as the English Separatists, who revived the ancient practice of immersion, which they held

was essential to valid baptism of true believers in the Baptist doctrines. From these early Baptists came the Particular Baptists, who also adhered to immersion and held Calvin's tenet of predestination. Though encouraged by the Puritan movement, neither the General nor the Particular Baptists made marked progress as church influences until late in the XVIII. cent., when they were stimulated by the religious awakening of John Wesley. With the formation of the English Baptist Missionary Society in 1792, both denominations developed rapidly. A century later the General and Particular Baptists were completely amalgamated as one church.

The first Baptist Church in America was established as early as 1638 in Providence, R. I. Its founder, Roger Williams, had been a minister banished from the colony of Massachusetts for holding dangerous religious views. A few years later other churches were opened in Newport and Boston. The early Baptists in Massachusetts were subject to persecutions until 1691, and up to the Wesleyan revival in 1734 the creed made little headway in New England. Its growth was much more pronounced in the southern colonies. An influential group of churches in the Philadelphia district in 1707 organized the Philadelphia Association, which became the most influential body of Baptists in America. It adopted the Philadelphia Confession, embodying a standard of doctrine that survives today.

At the outbreak of the Revolution the Baptists numbered about 10,000. By the close of the century they had increased to 100,000, distributed among 1,200 churches. Thereafter came the great westward movement and the Baptists developed with it by vigorous missionary work. In the XIX. cent. the church was rent by grave dissensions, resulting in the seceding of groups which formed the Disciples and the Primitive Baptists as separate bodies. The divisions of the Baptist denomination in the United States embrace the Regular Baptists, Free Baptists, Free Will Baptists, General Six-Principle Baptists, Seventh-Day Baptists, General Baptists, Separate Baptists, United Baptists, Baptist Church of Christ, Primitive Baptists, and Old Two-Seed-in-the-Spirit Predestination Baptists.

The American Baptists have a notable record in educational work. Even before the Revolution they began to establish schools. Brown, Colgate, and George Washington universities, as well as the University of Chicago, were founded by them. They have some 15 theological schools, as well as others of collegiate grade and academies numbering 130.

Their churches in the United States aggregate 60,000 in number and their membership (1922), embracing all divisions, was about 8,000,000.

BAPTIST YOUNG PEOPLES' UNION OF AMERICA, an organization of Baptist Young Peoples' Societies of the United States and Canada, founded 1891 in Chicago, where its headquarters have since remained. Its aim is to develop Christian character, maintain high ethical standards in social and business relations, bring new members into the church and work in harmony with the churches of the denomination. Special attention is given to the study of the Bible. Annual meetings are held at which subjects of religious interest are discussed by eminent speakers. The organization has senior and junior departments, each with its separate publication. The membership is about 1,000,000.

BAR, in heraldry, a broad horizontal band crossing the escutcheon, but smaller than the fess. *Bar sinister*, as a sign of illegitimacy, is a misnomer, arising from a mistranslation of the Fr. *barre*, which in heraldry means a 'band sinister.' A 'baton sinister' was often placed on a shield by heralds to indicate illegitimate birth.

BAR, fort. tn., Podolia, Russia (49° N., 27° 55' E.); grain; leather dressing, distilling; scene of *Confederation of Bar*. Pop. 11,000, more than half Jews.

BARA, warlike people of southern Madagascar.

BARA BANKI (26° 56' N., 81° 13' E.); town and district, United Provinces, India; wheat; area, 1,753 sq. miles. Pop. 1,179,323.

BARABA STEPPE (c. 54° 30' N.; 78° E.), steppe region, Tomsk, Russia, in Asia.

BARABBAS, Biblical character; imprisoned for murder, but chosen by Jews to be saved when Pilate offered them choice between B. and Jesus; illustrates popular injustice.

BARABOO, county seat of Sauk co., Wisconsin, located on the Baraboo River, about 40 miles northwest of Madison, the State capital. It has a picturesque location, 1,000 feet above sea level, and is the center of a rich agricultural region. It has excellent water power, which has promoted its growth as a manufacturing center. There are linen and woolen mills, creameries, canning factories, railroad shops and iron plants. The water works are municipally owned. The city has a national bank, daily, weekly and monthly peri-

odicals, gas works and electric lighting plant. It is governed by a mayor and municipal council under an incorporation charter of 1882. Pop. 5,538.

BARABRA, name given to the Nubian dwellers in the Egyptian Sudan.

BARACALDO (43° 17' N., 2° 56' W.), port, on Nervion, Biscay, Spain; iron, dynamite. Pop. 15,000.

BARALONG CASE, THE. On August 19, 1915, the steamer Nicosian, with a cargo of army mules from America, was torpedoed by a Ger. submarine about 60 m. off Queenstown, and a boarding party was sent to finish off the vessel with bombs. The Brit. armed auxiliary Baralong, disguised as a tramp steamer, came on the scene and sank the U-boat with gun-fire. Ger. crew put off in a boat to Nicosian. The Amer. cattlemen, observing that the Germans in the first boat carried bombs, allowed them on board, and then battered in their heads with furnace bars. The second boatload met a similar fate. Nicosian proceeded to Avonmouth. In Nov. the Ger. Government sent a protest to Brit. Government, and adduced sworn statements by cattlemen that the men of Baralong murdered the crew of the submarine as they were struggling in the water. The documents were thoroughly discredited. Germany demanded that the men of Baralong be tried for murder. On Dec. 14 Sir Edward Grey offered to submit the case to a tribunal of Amer. naval officers, provided that Germany agreed to have three incidents of Ger. barbarism investigated at the same time. The offer was declined, and Ger. threatened ruthless zeppelin warfare in retaliation. The agitation was skillfully worked up in Germany as an excuse for more 'frightfulness.'

BARANETZ, or **BAROMETZ**, the rhizome of a fern native to deserts of Scythia; known as 'Scythian lamb,' because a stout piece of the rhizome can be trimmed to a remarkable likeness of the animal.

BARANTE, AMABLE GUILLAUME PROSPER BRUGIERE, BARON DE (1782-1866), Fr. statesman and author; held various public offices under Napoleon and Louis Philippe; pub. *Histoire des ducs de Bourgogne de la Maison de Valois* (1824-28); trans. works of Schiller, and Shakespeare's *Hamlet*.

BARASAT (22° 43' N., 88° 32' E.), town Twenty-four Parganas, Bengal, India. Pop. 8,600.

BAR ASSOCIATION, AMERICAN, organization of lawyers, now comprising in its membership 17,000 lawyers from

all parts of the United States. Any member of the legal profession is eligible who has been a member in good standing of the bar of any State for five years. The organization was founded in 1878. Its object, as defined in its constitution, is 'to advance the science of jurisprudence, promote the administration of justice and uniformity of legislation throughout the Union, uphold the honor of the profession of the law and encourage cordial intercourse among the members of the American bar.' Annual meetings are held lasting for several days, at which papers are read by eminent members of the profession and topics discussed looking toward the betterment of judicial processes and the maintenance of ethical professional standards. Committees are appointed to study existing laws, point out defects and suggest improvements. The influence exerted by the Association is profound, and it has proved a potent force in elevating the standards of legal education and promoting uniformity of legislation throughout the country.

BARATARIA.—(1) So-called island assigned in *Don Quixote* to Sancho Panza as his government. (2) Retreat, delta of Mississippi (29° 40' N., 90° W.), of band of smugglers, slavers and pirates under Jean Lafitte. (3) Imaginary kingdom in Gilbert and Sullivan's *Gondoliers*.

BARATIER, JOHANN PHILIPP (1721-40), Ger. scholar; famous for precocious ability; proficient in Fr., Dutch, Lat., Gk., and Hebrew languages; Master of Arts (Haile) at age of fourteen.

BARATIERI, ORESTE (1841-1901), Ital. general; fought under Garibaldi; distinguished until 1896, when after defeat by Abyssinians, he was tried by military court and resigned.

BARB, backward arrow points; Moorish breed of horses; breed of pigeons; linen band about neck and chin worn by nuns; mucous membrane under tongue of horses and cattle; fleshy appendages on mouth of barbel; a leaf of heraldic rose.

BARBADOS, BARBADOES (13° 5' N., 59° 36' W.), most easterly of Brit. W. Indian Islands; length, 21 miles; width 14 miles; area, 166 sq. miles; exports sugar, molasses, rum, hides, tamarinds, aloes, chemicals, whale oil; imports coal, machinery, timber, rice, flour, etc.; administrated by Gov., Executive and Legislative Councils, and Representative Assembly; chief town, Bridgetown; government system of education; nine-tenths of inhabitants negroes; climate hot; has belonged to Britain since 1605. Pop. 176,000. See MAP WEST INDIES.

BARBARIANS, term applied by Greeks to describe all non-Greeks, probably from 'bar-bar,' the sounds their language seemed; later Romans applied it to those beyond pale of their civilization.

BARBAROSSA. See **FREDERICK I.**

BARBAROSSA ('Red-beard'), Horuk and Khair Eddin, Turk. corsairs; Horuk was captured and beheaded by the Spaniards at Oran (1518). Younger brother captured at Algiers (1519), Tunis (1533), and became admiral of Turk. fleet under Solyman II. (1536). From that year until his death (1546) he was known as 'the scourge of the Mediterranean,' and the inveterate foe of all Christians.

BARBAROUX, CHARLES JEAN MARIE (1767-94), Fr. revolutionist; of the Girondist faction; boldly opposed Marat and Robespierre, and was by them denounced as an enemy of the republic; guillotined at Bordeaux.

BARBARY, former name for region of Northern Africa, inhabited by Berbers, and including Morocco, Algeria, Tunisia, and Tripoli.

BARBARY APE (*Macacus inuus*); is tallest, gregarious; inhabits Algeria, Morocco, and Gibraltar Rock.

BARBAULD, ANNA LETITIA (1743-1825), Eng. poetess; dau. of Dr. John Aiken (q.v.); m. Rochemont B.; wrote *Hymns in Prose for Children*; edit. letters of Samuel Richardson, etc.

BARBAZAN, capital, Fr. canton, Haute-Garonne arr. of Saint-Gaudens; mineral springs.

BARBECUE, buccaneer's term for a framework on which large pieces of meat were roasted; also applied to meat thus roasted; in U.S. an *al fresco* feast where meat is similarly cooked.

BARBED WIRE ENTANGLEMENTS are the modern development of the old Cheveaux-de-frise, (a long bar studded with pointed rods or spikes), which was devised by the Friesians to hinder the progress of enemy cavalry.

The success of barbed wire for barricade and entanglement work in warfare was a foregone conclusion after its development on western ranches had demonstrated its ability to withstand the advance of cattle and of men. Its cheapness and the compact form in which it can be transported were additional factors contributing to its popularity.

While its first use in the Spanish-American war, was considered a success at the time, it was not until the World War that it exhibited its greatest advantage, namely the ability to withstand

heavy artillery fire with no lessening of its effectiveness. Throughout this war it was used extensively by both contestants. While the soldiers of both sides were equipped with wire cutters and grapples, these were rather ineffectual, because their use meant exposure to enemy fire. The only method of attack that the barbed wire entanglements could not impede to any considerable extent was that of the tanks, which however was a development of the latter part of the war.

BARBEL (*Barbus vulgaris*); fish of Cyprinid family.

BARBÉ - MARBOIS, FRANÇOIS, MARQUIS DE (1745-1837), Fr. politician; eulogized Napoleon, whom he indifferently served, and was made a peer by Louis XVIII.; pub. *Reflexions sur la colonie de Saint-Domingue* (1794); *La Guyane* (1822); and other works.

BARBER (Lat. *barba*, beard), trimmer of beards; Eng. b's were incorporated in 1461 by Edward IV.; they were joined to the Surgeons' Company by Henry VIII., but their operations, apart from beard-trimming, were confined to blood-letting and extraction of teeth; in 1745 George II. gave the b's a separate corporation, but barber's sign, the pole, may still sometimes be seen accompanied by the surgeon's basin. B.'s shop a place of gossip in Horace's time, remained so until days of daily postman and newspaper; *B. of Seville*, comic opera, masterpiece of Rossini.

BARBER, DONN (1871), architect; b. Washington, D.C. He was educated at Yale; special course in architecture Columbia; diploma Ecole des Beaux Arts, Paris, 1898; practiced in New York from 1900. Chief works: National Park Bank Buildings, the Mutual Bank, Lotos Club Bldg., Institute of Musical Art Bldg. (all in New York), Connecticut State Library, Dept. of Justice Building, Washington, D.C., etc. An originator of the atelier idea in U.S. and head of Atelier Donn Barber. Editor of *The New York Architect*

BARBERINI, powerful Ital. family settled in Florence since XI. cent. Mafteo B. became Pope Urban VIII. (1623), and several of his relatives were made cardinals; magnificent B. palace and library (Rome) were founded by them.

BARBERRY (*Berberis vulgaris*), shrub of order Berberidaceæ, with edible berries.

BARBERTON, a city in Summit co.; Ohio, 39 miles from Cleveland and 7 miles S.W. of Akron, on the Erie, Pennsylvania, Baltimore and Ohio and

Northern Ohio railroads and on the Ohio Canal. It was founded by, and derives its name from, O. C. Barber, whose Diamond Match Works are located there and form the town's principal industry. From its foundation in 1893 it has had a phenomenal growth and has developed many diversified manufacturing establishments. It has rubber and iron works, potteries, sewer-pipe mills, strawboard works and other industries that disburse annually more than \$2,000,000 in wages. Its excellent railroad service is a large factor in its prosperity. The city is governed by a mayor and common council. Pop. 13,811.

BARBÈS, ARMAND (1810-70), Fr. politician and revolutionary; called *le Bayard de la démocratie*.

BARBETTE (Fr.), protected platform for artillery, either in a fortification or battleship.

BARBEY D'AUREVILLE, JULES AMÉDÉE (1808-89), Fr. novelist; noted for his handling of criminology; pub. *Une Vieille Maîtresse* (1851); *L'Ensecelée* (1854); *Chevalier Destouches* (1864); *Les Diaboliques* (1874).

BARBICAN, an outwork, or gateway-tower, to protect a drawbridge. The places bearing this name in London, Plymouth, and other towns mark the sites of such defensive buildings.

BARBIER, ANTOINE ALEXANDRE (1765-1825), Fr. librarian; discovered the Fénelon MSS.; was librarian under the Directoire, Conseil d'Etat, and Napoleon, and had a large share in the foundation of the great libraries at the Louvre, Fontainebleau, and elsewhere.

BARBIER, HENRI AUGUSTE (1805-82), Fr. satirical poet; pub. metrical trans. of Shakespeare's *Julius Caesar* (1848), and collaborated with de Wailly in the libretto of Berlioz's *Benevenuto Cellini*; best known for his satires, *Iambes* (1831).

BARBITON, ancient stringed musical instrument, familiar by name to readers of classics, and believed to be of Persian origin; it was shaped something like a lute.

BARBIZON (48° 25' N., 2° 35' E.), village, borders of forest of Fontainebleau, France; home of Millet; gave name to Barbizon School of landscape painters, founded by Rousseau, Millet, Corot, Dupré, Daubigny, and others.

BARBOU, Fr. family of famous printers. John B. established press at Lyons in early XVI. cent.; they ultimately removed to Paris, and sold business (1808) to firm of Delalain.

BARBOUR, JOHN (1318-95), Scot. poet; regarded as father of Scot. poetry; archdeacon of Aberdeen; wrote a narrative poem, *The Brus*, in twenty books, and upwards of 13,000 lines, for which he received from King Robert II., in 1377, a gift of £10, and in following year a perpetual annuity of twenty shillings. *The Brus* was first printed at Edinburgh in 1571.

BARBOUR, RALPH HENRY (1870); ('Richard Stillman Powell') author. He was educated at New Church School, Waltham and Highland Mil. Academy, Worcester, Mass. Has contributed verse and short fiction to magazines under name of 'Richard Stillman Powell'. Author: *Phyllis in Bohemia* (with L. H. Bickford) *The Halfback, For the Honor of the School, Captain of the Crew, Behind the Line, The Book of School and College Sports, On Your Mark, The Arrival of Johnson, Kitty of the Roses, Four in Camp, The Crimson Sweater, Dick and Harriet, Four Afloat, Forward Pass, The Harbor of Love, The Secret Play, Heart's Content*, etc.

BARBOUR, THOMAS SEYMOUR (1853-1915), clergyman; b. Hartford, Conn. Educated Brown University and Rochester Theological Seminary. Ordained Baptist ministry, 1877; pastor Brockport, N.Y., 1877-81; Orange, N.J., 1881-3; Fall River, Mass., 1883-95; Brookline, Mass., 1896-8; foreign secretary American Baptist Foreign Mission Society 1899-1912.

BARBUDA (17° 40' N., 61° 50' W.); island, Leeward group, Brit. W. Indies; cattle.

BARBUSSE, HENRI (1874); Fr. author; on the outbreak of World War joined the ranks, and twice won the Croix de Guerre; wrote a remarkable war book, *Le Feu*, a crushing indictment of war and the war spirit.

BARCA, Carthaginian family. - See HAMILCAR, HANNUBAL, HANNIBAL.

BARCA, ancient city, Cyrenaica, N. Africa; modern Merj.

BARCAROLLE, a class of song peculiar to Venetian gondollers, with a simple, swinging measure; hence it has become name for a similar sort of musical composition; form used by Mendelssohn, Chopin, and others.

BARCELLONA (38° 7' N., 15° 10' E.); town, Sicily. Pop. (commune) 24,000.

BARCELONA. (1) Prov., Catalonia, Spain; mountains rich in iron, etc.; wine, oil, fruit, cork; woollens, cottons. Area, 2,969 sq. m.; pop. 1,200,000. (2) Cap. of above (41° 23' N., 2° 11' E.); first

commercial center and second seapt. of Spain; good harbor; univ.; *Rambla* is one of finest promenades in Europe; noble cathedral; cotton manufactures; soap and glycerine factories, tanneries, etc.; chief exports, almonds, saffron, olive oil, wines. Pop. 621,400.

BARCLAY, ALEXANDER (1475-1552), Scot. poet; held preferments at Ottery St. Mary, All Hallows, Lombard Street, and at Croydon. He wrote eclogues, but is chiefly known for his free trans. of Sebastian Brant's *Ship of Fools*, written in Chaucerian stanzas, in which he lashes the sins and follies of his time.

BARCLAY, FLORENCE (1862-1921), Eng. novelist; wrote numerous sentimental and very popular novels, including *The Rosary*, *The Upas Tree*, etc.

BARCLAY, JOHN (1582-1621), Scot. satirist; lived chiefly in London and France; pub. *Sylvoe*, collection of Latin poems (London, 1606); other works were *Satyricon*, a satire on the Jesuits, and *Argenis*, a fanciful romance in the style of Sidney's *Arcadia*.

BARCLAY, JOHN (1734-98), Scot. Presbyterian minister; founded Berean or Barclayite sect.

BARCLAY, JOHN (1758-1826), Scot. surgeon and author; anatomical collection nucleus of Baredian Museum, Edinburgh.

BARCLAY, ROBERT (1648-90), Scot. Quaker; gov. of East New Jersey; his chief work was *An Apology for the True Christian Divinity*, pub. in Latin (Amsterdam, 1676), trans. into Eng., 1678.

BARCLAY DE TOLLY, MICHAEL (1760-1818), Russ. field-marshal; Minister of War, 1810, commander-in-chief of western army, 1812, and of whole Russ. army at Dresden, Kulm, Leipzig, and Paris, 1813-14; Count (1815).

BARCLAY-ALLARDYCE, ROBERT (1779-1854), noted pedestrian; walked 1000 miles in 1000 consecutive hours, 1809.

BARCOCHEBAS, or **BAR-COCHBA**, led Jewish rebellion against Rome, 132-135 A.D.

BAR, CONFEDERATION OF, formed by Polish nobles at Bar (1768) to oppose Russ. aggression in the person of her representative, Prince Repnin.

BAR, THE.—(1) Division in a court of law: in the higher courts K.C.'s are admitted within the b., other legal members sit outside. (2) The dock wherein the prisoner stands in criminal cases, hence

the form of address, 'prisoner at the bar.' (3) A railed space in the Houses of Parliament known as the 'bar of the House.' To be 'called to the Bar' in England is when one of the Inns of Court summons a student in law, and he thus becomes a barrister.

BARD, name for Celtic poet, who enjoyed special social rank; later applied to verse-writers in general. As national minstrels they flourished in Early Gaul and Britain, and their primitive office has been revived in Wales. The Welsh b's were exempt from taxes and military service, and up to the time of Elizabeth, bardic gatherings (*Eisteddfodau*) were summoned by royal authority. The modern revival began c. 1822.

BARDAISAN, BARDESANES (154-222 A.D.), early Christian teacher; b. Edessa, Mesopotamia; author of numerous religious writings, all of which are lost, with the exception of the *Hymn of the Soul* contained in the apocryphal *Acts of Thomas*.

BARDI, comm.; prov. Piacenza, Italy (44° 38' N., 9° 44' E.); fortified château. Pop. 7,600.

BARDILL, CHRISTOPH GOTTFRIED (1761-1808), Ger. philosopher; pub. *Grundriss der ersten Logik* (1800), *Briefe über den Ursprung der Metaphysik*, etc.

BARDSEY (52° 45' N., 4° 48' W.); 'bard's island,' N. point Cardigan Bay, Wales; legendary last retreat of Welsh bards; farming and fishing; lighthouse.

BAREBONE, PRAISE-GOD, BARBON (d. 1680), Eng. tradesman; Baptist preacher, and later Fifth Monarchy man (q.v.); sat as representative of the City of London in Cromwell's Parliament of nominees (1653), which was derisively called after him 'Barebone's Parliament'; was an active opponent of the Restoration.

BAREFOOTED RELIGIOUS ORDERS, DISCALCED ORDERS, include those who went literally barefoot, such as the Alcantarine branch (before 1897) of the Franciscan Order, and those who wear sandals, such as Franciscans generally, with the Colettines and Capuchin sisters, the Camaldolese, Discalced Carmelites, Passionists, and branches of the Oisterclans, Augustinians, and Servites.

BAREGES (42° 54' N., 0° 6' E.); village, Hautes-Pyrénées, France; sulphurous springs.

BAREILLY, BARELI (28° 26' N., 79° 33' E.), city and capital, B. district, United Provinces, Brit. India; Mutiny

BARENTIN

of 1857 first broke out here; Government Coll., mosques, citadel; manufactures furniture. Pop. 1911, 129,400. District area, 1580 sq. miles. Pop. 1,000,000.

BARENTIN (49° 35' N.; 0° 55' E.), town, Seine-Inferieure, France; cotton. Pop. 5,500.

BARENTS SEA (76° 10' N.; 40° E.), part of Arctic Ocean, between Novaya Zemlya, Spitzbergen, and mainland.

BARENTS, WILLEM (d. 1597); Dutch navigator; conducted three unsuccessful expeditions from Holland.

BARÈRE DE VIEUZAC, BERTRAND (1755-1841), Fr. journalist and revolutionary; became deputy to States-general (1789), delegate to National Convention (1792); at death was last surviving member of Committee of Public Safety. A conscienceless 'trimmer,' he joined Robespierre after having attacked him; took employment under Napoleon; went over to Bourbons (1814); banished as a regicide (1815); accepted pension from Louis Philippe.

BARETTI, GIUSEPPE MARC' ANTONIO (1719-89), Ital. critic; settled in London, and was associated with Dr. Johnson and the Thrales (Boswell's *Life*); became secretary to Royal Academy of Painting; wrote on Shakespeare and other authors, and compiled a *Dictionary and Grammar of the Italian Language*.

BARFLEUR (49° 41' N.; 1° 16' W.), ancient seaport, Manche, France; highest Fr. lighthouse at Cape B.; *White Ship* wrecked outside harbor, 1120.

BARFURUSH, BALFRUSH (36° 32' N., 52° 43' E.), town, Mazandarin, Persia; important commercial center; colleges, bazaars; rice, cotton. Pop. 60,000.

BARGA, mt. vil., Italy (44° 4' N., 10° 29' E.); church contains interesting late Romanesque pulpit. Pop. (comm.) 8,000.

BARGA PASS, much-used pass over Himalayas, Bashahr State, Punjab.

BARGAIN AND SALE, legal term for a contract by which real or personal property is transferred from one individual to another.

BARGE (44° 42' N., 7° 18' E.), town, Italy; slate quarries. Pop. 10,000.

BARGE, flat-bottomed boat used on canals, and towed by a horse; on tidal waters they are sometimes fitted with sails; a 'lighter,' boat used for loading or unloading vessels; stationary houseboat like the Oxford College b's on the

BARING

Iris; in earlier times a highly-decorated craft used by kings and nobles.

BARGEBOARD, a piece of board, often ornamented, covering the roof timbers of a gable.

BARGE CANAL, New York. See NEW YORK STATE BARGE CANAL.

BARHAM, RICHARD HARRIS, 'THOMAS INGOLDSBY' (1788-1845), Eng. humorist; ed. St. Paul's School and Brasenose Coll., Oxford; clergyman and minor canon of St. Paul's; acquired (1837 onwards) lasting fame by his *Ingoldsby Legends*, combining humor with deep scholarship.

BAR HARBOR, summer resort; in Hancock co., Maine, on the east shore of Mt. Desert Island. Its name is derived from a sandy bar that extends from Mt. Desert to an island of the Porcupine group. It is served by the Maine Central Railroad and by many lines of steamers from New York, Boston and other ports. On the north shore of Eastern Bay there is a naval coaling station, and the place is a favorite rendezvous for naval vessels during the summer when the season is at its height. The resort is popular with tourists and there are many magnificent estates of summer residents. Within a short distance are many places of great scenic beauty, such as Spouting Horn, Eagle Cliff, Thunder Cave, Great and Schooner Heads and The Ovens. Mount Desert was first settled by French Jesuits in 1608, following its discovery by Champlain. This colony, however, was destroyed, and the first permanent settlement was made by the English in 1761. Pop. 4,441.

BARI (41° 7' N., 16° 49' E.); seaport; capital of B. province, Apulia, Italy; abp.'s seat; pilgrim church, St. Nicola, founded 1027; nautical school; olive oil, soap. Pop. 109,200. Province area, 2065 sq. miles. Pop. 936,000.

BARILI (10° 10' N.; 123° 30' E.); town, Cebu, Philippine Islands; Ind. corn.

BARILLA, an impure carbonate of soda obtained by burning plants grown in salt marshes or on seacoast; formerly widely used method, but abandoned now that the carbonate is obtained from salt.

BARING, family of Eng. financiers and bankers; firm of Baring Bros. (1770-1890), 1st banking-house in Europe; members of the family have been prominent statesmen, and obtained respectively baronies of Ashburton, Northbrook (afterwards made an earldom), Revelstoke, and earldom of Cromer.

BARING, MAJOR HON. MAURICE (1874), English journalist and author; He was educated at Eton and Cambridge. He entered the diplomatic service in 1898, and at various times served in the British Embassies at Paris, Copenhagen and Rome. From 1904 to 1908 he acted as special correspondent for the Morning Post in Manchuria and Russia. During the Balkan Wars he was a special correspondent for the London Times. He served with distinction in the World War in connection with the Royal Flying Corps. Among his writings are, *The Black Prince* (1902), *A Year in Russia* (1907), *Dead Letters* (1910), *The Gray Stocking and Other Plays* (1912), *The Main Springs of Russia* (1914), *English Landscape and Anthology* (1916), *Round the World in Any Number of Ways* (1919), and *Overlooked* (1922).

BARING-GOULD, REV. SABINE (1834-1923), Eng. author and clergyman; writer of numerous novels, hymns, religious and antiquarian works.

BARINGO (0° 49' N., 36° 10' E.), lake, Central Africa; no outlet; discovered, 1883

BARISAL (22° 50' N.; 90° 20' E.), town, Dacca, Bengal, India. Pop. 19,000.

BARIUM (Ba = 137.37), metallic element belonging to alkaline earths; of silver lustre, oxidizes readily, reacts with water and alcohol; occurs chiefly as barytes and witherite; spectrum shows two characteristic green lines. Technically important derivatives are barium sulphite (BaSO₃), used as pigment under name 'blanc fixe'; barium nitrate, employed in explosives and fireworks; barium peroxide (BaO₂), used in production of hydrogen peroxide.

BARIUM CHLORIDE, BaCl₂·2H₂O. A heavy poisonous solid usually occurring as colorless, flat crystals. Specific gravity 3.097, melting point 860° C. Readily soluble in water. It is prepared by reacting upon barium sulphide or barium carbonate (witherite) with hydrochloric acid, and is purified by recrystallization. Or it may be produced by heating in a reverberatory furnace a mixture of barium sulphate, charcoal, calcium chloride and limestone. It is used in medicine as a heart stimulant and tonic; in the leather industry; as a rat and vermin poison; in boilers for preventing the formation of scale; and as a reagent in analytical chemistry.

BAR-JESUS, Jewish sorcerer smitten with blindness for opposing Paul at Paphos (Acts 13); probably a professional magician.

BARK, all the tissues in a stem outside the cork cambium or phellogen (see CORK); tissue dies being cut off from food supply; first phellogen disappears and is replaced by second, deeper lying; thus bark increases in thickness; certain varieties of commercial and medicinal importance (e.g.) Peruvian or cinchona barks, from which quinine is prepared.

BARKA, or **BARCA**, E. div. of Tripoli, N. Africa (30° 50' N., 22° 40' E.), consists of elevated plateau projecting into Mediterranean, to S. a series of depressions, and then land rising into a desert plateau; traversed by caravan tracks; many oases; coast region might be developed; fairly good harbors (Barka, Derna, Bengasi); ruins of various cities (Arsinoë, Cyrene, etc.); was Gr. Cyrenaica. After war of 1911, Tripoli became Italian, but Turk. troops remained in Barka, a reason for Italy entering Great War. (See SENSUS.) Area, c. 70,000 sq. m.; pop. c. 300,000.

BARKER, EDMUND HENRY (1788-1839), Eng. scholar; edited classics.

BARKER, ELSA, American authoress; born Leicester, Vt. In 1901 she became an associate editor of the Consolidated Encyclopedic Library. She lectured under the auspices of the N.Y. Board of Education in 1904-5. During 1909-10 she was on the editorial staff of Hampton's Magazine. From 1910 until 1914 she lived abroad, dividing her time between London and Paris. Her poems and prose writings include *The Song of Mary Bethel* (1909); *The Frozen Grail and Other Poems* (1910); *The Book of Love* (poems) (1912); *Letters From the Living Dead Man* (1914); *Songs of a Vagrom Angel* (1916); and *Last Letters from the Living Dead Man* (1919). A play by her on capital and labor, *The Scab*, was produced in 1904. She has also contributed largely to magazines.

BARKER, FORDYCE (1818-1891). American physician; born at Walton, Me. He graduated from Bowdoin College in 1836 and in 1841 from the Bowdoin Medical School. Following a course of medicine at Harvard, he studied in Paris and Edinburgh. He began practice at Norwich, Ct., in 1845 and a year later became professor of obstetrics at Bowdoin. In 1850 he was called to the professorship of midwifery in New York Medical College and in 1852 became obstetrical physician at Bellevue Hospital. Of his numerous writings his treatise on *Puerperal Diseases* is the most noted. For many years he ranked as one of the foremost medical men in America.

BARKER, HARLEY GRANVILLE

(1877), actor, playwright, and theatrical manager; belongs to Bernard Shaw and Galsworthy school of dramatists; remarkable for faithfulness to actuality, and combination of literary criticism and realism in dialogue; wrote *The Madras House*, *The Voysey Inheritance*, etc.

BARKER, ROBERT (1739-1806); Irish artist associated with Edinburgh.

BARKER, WHARTON (1846-1921), American financier and publicist, born in Philadelphia. He graduated from the University of Pennsylvania in 1866, having previously served in the Civil War. He entered the banking business, became a financial agent of the Russian Government and later obtained valuable concessions in China. In 1869 he founded the *Penn Monthly*, a periodical devoted to social and economic problems, which afterwards changed its name to *The American*. He was active in politics, was an ardent supporter of Garfield and Harrison and an equally ardent opponent of a third term for General Grant. In 1896 he shifted his allegiance to the Populist party and in 1900 was its candidate for President.

BARKER'S MILL, engine, named after inventor, worked by pressure of water instead of that of steam.

BARKING (51° 33' N.; 0° 5' E.), market town, Essex, England; ruined abbey; factories. Pop. 38,000.

BARKLY EAST (30° 58' S., 27° 39' E.), town, Cape Province, S. Africa; sheep farming.

BARKLY WEST (28° 30' S., 24° 35' E.), town, Cape Province, S. Africa; diamonds.

BARKLY, SIR HENRY (1815-98); Brit. governor of Brit. Guiana, Jamaica, Victoria, Mauritius, and Cape, successively (1848-77).

BARLAAM AND JOSAPHAT, Christianized medieval romance of Buddhist origin.

BAR-LE-DUC (48° 47' N.; 5° 10' E.); town, on Ornain, Meuse, France; was capital of medieval county, afterwards Duchy, of Bar; birthplace of great Duke of Guise and Marshal Oudinot. Pop. 17,700.

BARLETTA (41° 19' N.; 16° 15' E.), seaport town, Bari, Italy; tartaric acid. Pop. 41,000.

BARLEY (*Hordeum sativum*), important hardy cereal including numerous sub-species, cultivated from ancient times in temperate regions for domestic cookery, malting, and brewing. Under fair conditions one peck may yield about

4½ bushels (each 56 lb.). B. is liable to same parasitic diseases as wheat. Of the three varieties (*H. distichum*, *H. hexastichum*, i.e. two-rowed and six-rowed, and *H. vulgare*, or common, which is four-rowed), first is best for brewing, while second is thought scarcely worth while cultivating. Decorative character recognized by ancients; Romans used it as adornment on coins of corn-goddess Ceres. *Barley-corn*, formerly barley-grains, a measure of length; malt liquor, personified in Burns' song, 'John B.' — *Barley sugar*, sweetmeat made of sugar and b. water.

BARLEY, one of the oldest of cultivated grains, said to be known to the Chinese twenty years before the Christian era. It is mentioned in the Bible and was grown by the early Egyptians, Greeks and Romans. It flourished in a variety of soils and climates, appearing as far north as Alaska, Iceland and Norway, and southward in India and other tropical countries. It thrives best on a well-drained loam soil, and resembles the wheat plant except that it does not grow as tall and the structure of the head differs. There are several types of barley including two-rowed, four-rowed, six-rowed, naked barley and fan, spratt or Brattledore barley, sometimes called German rice. Another variety is the chevalier, the parent of the barley grown in California. Two well-defined types are the two-rowed, which predominates in Europe, and the six-rowed, which is more common in the United States. The grain is used chiefly for malting and feed. It is sown in the spring in North America and in Northern Europe. In Mediterranean countries the sowing season is in the fall. In the United States it is grown quite extensively for hay. The grain is of service in cooking for thickening soups; it is also used for making cooling drinks for invalids, and other purposes. In 1922 the American crop was 194,000,000 bushels, sown over 7,550,000 acres and valued at \$88,500,000.

BARLEY-BREAK, old Eng. country game, played by three persons of each sex in couples, placed in three positions close to one another, the middle couple trying to catch the others, who, when caught, were put in the middle position, or *hell*.

BARLOW, FRANCIS CHANNING (1834-1896), American lawyer and soldier; born Brooklyn, N.Y. He graduated at Harvard in 1855 and began the practice of law in New York. At the outbreak of the Civil War he enlisted in the Twelfth N.Y. National Guard and in three months became lieutenant-

colonel of the Sixty-first N.Y. Volunteers. He showed conspicuous skill and bravery at Antietam, Chancellorsville and Gettysburg, and was promoted to the rank of brigadier general and brevet major general. He was Secretary of State for New York (1866-68) and in 1872-73 was Attorney General of the State. He was an active factor in running down the Tweed ring.

BARLOW, JANE (1860-1917); Irish authoress; born Clontarf, near Dublin. She was the daughter of a professor of Trinity College, received a thorough education and early evinced the possession of rare literary ability. In both verse and prose she portrayed with gentle humor and remarkable insight the joys and sorrows of simple Irish village life. Her first marked success was her *Irish Idylls* published in 1892. Among her other works are included: *Bogland Studies* (1892); *Kerrigan's Quality* (1893); *The Battle of the Frogs and Mice* (1894); *Ghost Bereft and Other Stories* (1902); *From Beach and Bogland* (1905); and *Flaws*, a Novel (1911). Dublin University conferred on her the degree of Doctor of Letters.

BARLOW, JOEL (1754-1812), American diplomat and man of letters, born at Redding, Conn. He received his education at Dartmouth and Yale, served two years as chaplain in the army and in 1786 was admitted to the bar. His tastes led him to literature however, and he wrote extensively on political and literary subjects. He had great poetical aspirations, but his poems, though greatly lauded at the time, never rose above mediocrity. His most pretentious works were *The Columbiad* and *Hasty Pudding*. He traveled abroad in the interests of a land scheme in 1788 and remained there for several years during which time his political opinions were greatly liberalized. In 1793 he realized a considerable fortune in commerce, and in 1795 became consul at Algiers, where he rendered valuable services to American prisoners. In 1805 he returned to America and remained there, chiefly engaged in literary pursuits, until 1811, when he accepted a mission to Napoleon. He met the latter near Vilna, during the disastrous retreat from Moscow, and died of exposure in a Polish village.

BARLOW, PETER (1776-1862), Eng. mathematician; prof. of Mathematics, Royal Military Academy, Woolwich; improved mariner's compass, the telescope, and encouraged steam locomotion.

BARLOW, SIR THOMAS (1845), Bart. (cr. 1901), physician-extraordinary to Queen Victoria and Edward VII.;

pres. of Royal Coll. of Physicians, 1910.

BAERM, yeast; scum on fermenting malt liquor.

BAR MAGNETS. Bars of hard steel, subjected to the influence of a lodestone, magnet, or the magnetic effect of an electric current, become bar magnets; (i.e.) one end becomes a north-seeking pole, the other a south-seeking pole. A compass is merely a bar magnet, supported on a pivot, or floated in a liquid by means of corks, etc.; the magnet being free to turn, parallels itself with the magnetic meridian. Bar magnets are usually placed in various positions around the binnacle of a mariner's compass to compensate for any steel or other magnetic material in the neighborhood, which may affect the accuracy of the compass.

BARMECIDES, Persian family founded by Barmak; appear in *Arabian Nights*, where is account of B. Feast, banquet of imaginary dishes served to a beggar whose sense of humor allowed him to pretend to eat them, become uproarious on visionary wine, and win his entertainer's goodwill by giving him a box on the ear.

BARMEN (51° 17' N.; 7° 11' E.); town, Dusseldorf district, Germany; ribbons. Pop. 169,200.

BARMOUTH (52° 44' N.; 4° 8' W.); summer resort, Cardigan Bay, Merionethshire, N. Wales.

BARNABAS ('son of consolation,' so called by the Apostles), the Apostle, was a Levite of Cyprus named Joses, who sold his land and gave the money to the Apostles. He was the uncle of Mark. Barnabas championed Paul, after the latter's conversion; was sent to Antioch; accompanied Paul on his first missionary journey; returned to Antioch and sailed with Mark to Cyprus, where he is said to have died as a martyr. The apocryphal Epistle of Barnabas is found in the *Codex Sinaiticus*, and Clement of Alexandria (200) frequently quotes it and attributes it erroneously to Barnabas. It deals with the attitude of the Church towards the Jewish law, in an anti-Judaistic spirit. Harnack gives its date as about 130.

BARNABITES, religious order of 'Regular Clerks of St. Paul,' founded in Milan, 1530; named from place of assembly, church of St. Barnabas.

BARNACLE, a crustacean which attaches itself to objects floating in the sea.

BARNACLE (or **BERNICLE**) **GOOSE**, bird which breeds in Spitzbergen and

Greenland; body white, head black, wings grey.

BARNARD, LADY ANNE (1750-1825), Scot. poetess; dau. of 5th Earl of Balcarres; m. Andrew B., who was app. colonial sec. at Cape of Good Hope. She is chiefly remembered for her ballad, *Auld Robin Gray*, written 1772 (pub. anonymously, 1783; authorship admitted to Sir W. Scott, 1823), and her *Letters* from the Cape.

BARNARD, EDWARD EMERSON (1857-1923), Amer. astronomer; born Nashville, Tenn. He studied at Vanderbilt University and University of the Pacific, Cal. He was the head of the Vanderbilt University laboratory, 1883-87, and astronomer in the Lick Observatory, Cal., 1887-95. In the latter year, he became professor of astronomy at Chicago University, combining with his duties the work of astronomer at Yerkes Observatory. His discoveries were many, the most important being that of the fifth satellite of Jupiter. He received many honors from abroad including the Lalande Gold Medal of the Paris Academy, the Arago gold medal, the Janssen gold medal and the gold medal of the Royal Astronomical Society of Great Britain.

BARNARD, FREDERICK AUGUSTUS PORTER (1809-1889), American educator; born Sheffield, Mass. He graduated from Yale College in 1828, held the chair of mathematics and natural philosophy in the University of Alabama 1837-48, and afterward of chemistry and natural history until 1854. He taught in the University of Mississippi 1854-56, and in the latter year became President of that institution. He left the South on the outbreak of the war, and in 1864 was called to the presidency of Columbia College, N.Y. Here he did his most important work, placing the college, which was far from prosperous when he became its head, on a broad university foundation. He was an ardent advocate of co-education, and Barnard College, named after him, owed its foundation chiefly to his efforts. He was a voluminous writer and a member of many learned societies. He resigned as president in 1888.

BARNARD, GEORGE GREY (1863), American sculptor, born Bellefonte, Pa. His earliest training was gained in the Art Institute of Chicago, following which he studied for three years in L'École des Beaux-Arts in Paris and for nine years in his studio in the same city. He first exhibited at the Champs de Mars, with such approval that he was elected a member of the Société Nationale des

Beaux-Arts. He returned to New York in 1896. The most notable production of his earlier period is *The Two Natures*, now in the Metropolitan Museum of Art, New York. Important later productions include *Brotherly Love*, *The Hewers*, *Maidenhood*, *God Pan* and the world famous *Lincoln*, unveiled in Lytton Park, Cincinnati, in 1917. He received the commission to execute all the sculpture of the new State Capitol of Pennsylvania. He was awarded gold medals at the Paris and Pan American Expositions. His sculpture is largely symbolic and reveals striking originality and remarkable technique.

BARNARD CASTLE (54° 33' N.; 1° 55' W.), market town, on Tees, Durham County, England; ruins of Castle Barnard; birthplace of John Balliol; scene of Scott's *Rokeby*; flax thread. Pop. 4,800.

BARNARD COLLEGE, an undergraduate college for women incorporated in the educational system of Columbia University, New York City. It derives its name from Frederick A. P. Barnard, at one time President of Columbia University, and an ardent advocate of higher education for women. It opened in the Fall of 1889 with 26 students and seven teachers selected from the teaching staff of Columbia. In 1900 an agreement was reached whereby the college became a part of Columbia University, though still retaining its separate corporate and financial organization and its internal administration. Its graduates receive their degrees from Columbia. In general the facilities of Columbia, its library and various opportunities in professional and post-graduate courses are at the disposal of Barnard students. The college has two courses of undergraduate instruction, each covering a four year period—a literary course and a scientific course. There is also a two year course, not leading to a degree, that is designed to provide a cultural basis for subsequent professional work. The college has 750 students and 104 teachers. Its buildings equipment and grounds are valued at over \$2,000,000 and its endowment is over \$4,000,000.

BARNARDO, THOMAS JOHN (1845-1905), Irish philanthropist; opened 'Dr. B.'s Home,' at Stepney, 1867, to shelter and train homeless children and afterwards established 111 similar refuges besides village at Barkingaside for girls.

BARNATO, BARNETT ISAACS (1852-97), S. African diamond merchant.

BARNAUL (53° 20' N., 83° 48' E.), town, Tomsk, Asiatic Russia; smelting furnaces. Pop. 61,300.

BARNAVE

BARNAVE, ANTOINE PIERRE, JOSEPH MARIE (1761-93), orator of Fr. Revolution, most distinguished after Marabeau; among first to oppose monarchy; escorted king back from Varennes; but opposed touching king's person; executed for having advised Louis XVI. to veto bills.

BARNBURNERS, faction of Amer. democratic party, so named (c. 1844) from drastic measures advocated to bring about reform.

BARNBY, SIR JOSEPH (1838-96), Eng. composer and conductor; head of Guildhall School of Music (1892); his works include *Rebekah*, an oratorio, anthems, part-songs, about 250 hymn-tunes.

BARNES, ALBERT (1798-1870), Amer. Presbyterian theologian; eloquent preacher and popular expositor of Scriptures.

BARNES, BARNABE (1569-1609), Eng. poet; pub. two plays, *The Devil's Charter* and *The Battle of Evesham*; also *Parthenophil* (odes, elegies, etc.) and *A Divine Century of Spiritual Sonnets*.

BARNES, SIR EDWARD (1776-838), Eng. general and gov. of Ceylon.

BARNES, RT. HON. GEORGE (1859), British statesman; began life as working engineer; entered Parliament (1906); supported government from beginning of World War; became first minister of pensions (1916); Labor minister in war cabinet (1917); Brit. representative of labor at the Peace Conference; attended as vice-president first International Labor Conference at Washington (1919). Resigned from government (Jan. 1920).

BARNES, JAMES (1806-1868), American soldier; born Boston, Mass. He graduated from West Point in 1829. Resigning from the army after seven years' service, he became a railroad engineer, achieving marked eminence in that profession. In the Civil War he was colonel of the 18th Massachusetts Volunteers, 1861-62, and brigadier-general of U.S. Volunteers 1862-65. He participated in the battles of Antietam, Fredericksburg, Chancellorsville and Gettysburg, where he was severely wounded. In 1865 he was made brevet-major general of volunteers for meritorious services.

BARNES, THOMAS (1785-1841), Eng. journalist; followed Dr. Stoddart as editor of *The Times* (1817); intimate with Lamb, Hazlitt, and others.

BARNES, WILLIAM (1801-86), Eng. poet and philologist; s. of farmer; was

BARNHARDT

successively lawyer's clerk, schoolmaster, and clergyman; pub. *Poems in the Dorset Dialect* (1844); *Homely Rhymes* (1858); *Collected Poems* (1879); *Philological Grammar* (1854); *Glossary of Dorset Dialect* (1863), etc. B. seems to have been a man of singular sweetness of character, and his poems of Dorset life have secured a firm place in modern Eng. lit.

BARNET (51° 37' N., 0° 12' W.), district, Herts, England; on Great North Road; great fair still held; scene of battle (1471) in Wars of Roses, where 'Kingmaker' fell; obelisk erected, 1740. Pop. 12,500.

BARNETT, GEORGE (1859), American officer U.S.M.C.; born Lancaster, Wis. He graduated at the U.S. Military Academy in 1881. Entering the service as a lieutenant in the Marine Corps, he rose rapidly through the various grades of the service until in Feb. 1914 he became Major General in command of the Marine Corps. To his efficient work is largely due the remarkable showing that the Marines made in the World War.

BARNETT, JOHN (1802-90), Eng. composer; b. Bedford; s. of Prussian jeweler who assumed Eng. name; sang on stage as boy, and received musical training; father of modern Eng. opera; *Mountain Sylph* (1834) well received at Lyceum; followed by *Fair Rosamond* (1837) and *Farinelli* (1839).

BARNETT, SAMUEL AUGUSTUS (1844-1913), Eng. clergyman and social reformer; Steward of Westminster; noted for Church work among White chapel poor; promoted Univ. Extension; first warden of Toynbee Hall; pub. *Fracturable Socialism* (1888).

BARNEVELD, vill., Gelderland prov.; Holland (52° 8' N., 5° 35' E.), 20 m. N.W. of Arnheim; manufactures paper; horse and cattle fairs. Pop. 9,300.

BARNVELDT, JAN VAN OLDEN (1547-1619), Dutch patriot and statesman; b. Utrecht; advocate-general, 1515; opposed warlike policy of Maurice of Nassau; proposed religious toleration, but as Remonstrant (follower of Jacobus Arminius, q.v.) was beheaded for treason. *Life*, by Motley.

BARNFIELD, RICHARD (1574-1627), Eng. poet and friend of Shakespeare; wrote *The Affectionate Shepherd* (1594), *Cynthia* (1598), *Lady Pecunia* (1598), etc. Works collected by Dr. Grosart and Prof. Arber (1882).

BARNHARDT, GEORGE COLUMBUS (1868), American army officer;

born Gold Hill, N.C. He graduated from West Point in 1892 and entered the service as second lieutenant in the 6th Cavalry. He served in the Santiago Campaign in the Spanish-American war and with the Relief Expedition in the boxer troubles of 1900. He took part in the quelling of the Filipino insurrection, and later was stationed on the Mexican border. During the World War he commanded the 28th Infantry in the St. Mihiel and Meuse-Argonne operations, and was made commander of the Second Brigade, First Division.

BARNIM (52° N., 13° 20' E.), district, Brandenburg, Prussia, embracing Berlin.

BARNESLEY, BLEAK B. (53° 34' N., 1° 28' W.), market town, parliamentary and municipal borough, on Dearne, Yorkshire; coal-fields; iron and steel; linen. Pop. 55,000.

BARNSTAPLE (51° 1' N., 4° 5' W.), seaport, Devonshire, England; municipal, parliamentary, and ancient royal borough; XII.-cent. bridge over river Taw; mediæval church and grammar school; ship-building, lace, pottery. Pop. 14,600.

BARNUM, PHINEAS TAYLOR (1810-91), Amer. showman; successfully toured with the dwarf, 'General Tom Thumb,' in U.S.A. and England (1842-44), and introduced Jenny Lind to the Amer. public. In 1871 he launched enterprise known as 'The Greatest Show on Earth,' with which he toured the world.

BAROCCHIO, GIACOMO (1507-73), Ital. architect; under the patronage of Pope Julius III. he succeeded Michael Angelo as the architect of St. Peter's (1564), and designed numerous other buildings in Rome; pub. *Five Orders of Architecture* (1563), and *Practical Perspective* (1583).

BARODA (23° N., 72° E.); native state, Gujerat, Bombay, India; ruled by Gaekwar under Brit. supervision; capital, B.; temples, colleges, cotton mills; area, 8,099 sq. miles. Pop. 1,952,000.

BAROGRAPH, a self-registering barometer, giving a continuous automatic record of pressure changes on a revolving drum driven by clockwork.

BAROMETER, instrument for measuring atmospheric pressure. Galileo's observation that water ordinarily rises in a pump to a height of about 34 ft. induced Torricelli to prove experimentally that the atmosphere has weight. He demonstrated that mercury filling a tube 3 ft. long sealed at one end, when in-

verted in a basin containing the same fluid sank to a level of about 30 in. above that of the mercury in the basin, a vacuum being left at the top of the tube. Subsequently, Pascal showed that the level of the mercury varied in different altitudes and in different weather, thus making Torricelli's appliance, provided with a scale, known as a weather glass and an instrument for determining altitudes. In the so-called cistern barometer the mercury level in the basin naturally varies with the level in the tube, rendering the exact observation of different pressures difficult owing to this 'error of capacity.' This is obviated in the Fortin barometer by a screw, by means of which the mercury in the cistern can be adjusted to a standard level indicated by an ivory point. See **ANEROID**.

BARON, in early times in England the word was used to distinguish a person who held lands of the sovereign, but was not in any sense a title. It was first employed as a title by Richard II., who in 1387 created John de Beauchamp b. of Kidderminster. Henry VI. was the first king to create a number of b.'s Charles II. gave b.'s a coronet. The title, which is hereditary to the heirs-male, is the lowest in the peerage. The children of a b. are addressed as 'The Honorable.'

BARON AND FEMME, FEME, Norman words, meaning man and wife, used in Eng. law and heraldry.

BARON, MICHEL (1653-1729), Fr. actor; leading actor of his period; played in Molière's company, and created many principal roles in Racine's tragedies.

BARONET, hereditary Brit. title instituted by James I., the first person thus cr. being Sir Nicholas Bacon, knight (f. of Francis Bacon), who received the honor in 1611. A b. takes precedence of a knight, but not of the younger sons of barons. His wife is styled 'Dame,' but usually is called 'Lady.'

BARONIUS, CÆSAR (1538-1607); Ital. cardinal and historian; chiefly remembered as author of *Annales Ecclesiastici*.

BARONS, WAR OF THE. See **ENGLAND**.

BARONY, division of a county in Ireland, equivalent to an Eng. 'hundred.'

BAROQUE, a term first applied to ill-shaped pearls, now denotes fantastic, bizarre, and decadent forms in art and nature.

BAROSS, GABOR (1848-92); Hungarian statesman and economic reformer.

BAROTAC NUEVO

BAROTAC NUEVO, town; Iloilo, Panay, Philippine islands. Pop. 12,000.

BAROTSELAND (c. 15° 25' S., 25° E.), district N.W. Rhodesia; inhabited by Bantu race.

BARQUE, three-masted ship; square-rigged on the fore and main masts, and fore-and-aft on the mizzen.

* **BARQUISMETO** (10° N.; 69° W.), city, state of Lara, Venezuela; bp. seat; coffee. Pop. 31,000.

BARR, AMELIA EDITH (1831-1919), Eng. novelist, went with husband to U.S., where she wrote novels, including *Jan Vedder's Wife* (1885), *Trinity Bells* (1899), *The Maid of Maiden Lane* (1900), *The Black Shilling* (1904), and *The House on Cherry Street* (1909).

BARR, ARCHIBALD (1855); Scot. engineer and inventor, was prof. of civil engineering at Leeds and at Glasgow (till 1913); chairman of Barr and Stroud, Ltd., Anniesland, Glasgow, which firm manufactures his numerous inventions, including fortress and field service and naval range-finders, electrical fire-control instruments for warships, etc.; has recently invented the Optophone, for enabling the blind to read books by sound.

BARR, ROBERT (1850-1912), Scot. novelist, was schoolmaster at Windsor, Canada, and later became journalist at Detroit. Returned to England (1881), and with Jerome K. Jerome founded the *Idler* (1892). Works include *Over the Border* (1903), *Cardillac* (1909), *The Swordmaker* (1910).

BARRA.—(1) Tn. and health resort, Italy (40° 50' N., 14° 18' E.), 4 m. E. of Naples. Pop. 12,000. (2) Isl. and par., Inverness-shire, Scotland (57° N., 7° 30' W.); fisheries; chief harbor, Castlebay. Pop. 2,600.

BARRACKPUR (22° 45' N., 88° 20' E.), town, on Hugli, Bengal, India; mills. Pop. 39,000.

BARRACKS. A standing army must be lodged apart from the civil population and the permanent buildings are called barracks; they are of various types and dimensions; many date from the XVIII. cent., others have been built of late years with more regard to modern ideas of comfort. The buildings are generally planned to form a quadrangle which is used as a drill ground.

BARRACOUTA, BARRACUDA, fish of tropical and subtropical regions which attacks man.

BARRAFRANCA (37° 21' N., 14° 13' E.), town among mountains of Sicily. Pop. 11,068.

BARRAS

BARRAGE, artillery term, meaning a barrier of gun fire from heavy artillery and machine guns, called by French *feu de barrage*, and by British 'curtain of fire.' Method was invented by French during the World War, and employed by them (1) between opposing trenches, to stop enemy attack; (2) in the rear and flank of objective, to isolate defenders in an attack and prevent reinforcements coming up. This method was used by British in battle of the Somme (July to Sept. 1916), but afterwards for purposes of attack was combined with the 'creeping barrage' devised chiefly by General Sir Henry (now Baron) Horne. Formerly the artillery had played upon line after line of enemy trenches, missing the rifle and machine-gun posts hidden between these, which were responsible for many casualties. In the new 'creeping barrage' no ground was neglected. In the attack the artillery started by bursting their shells about 150 yds. in front of their own lines, gradually advancing at a pace regulated by the infantryman's rate of progression. The system gave excellent results, and the men soon learned to follow the barrage closely. In the later stages of the war, when field guns were left behind temporarily owing to rapid advance, the machine-gun barrage at long ranges was brought to a pitch of considerable accuracy.

BARRA MANZA, town on Parahiba, Brazil. Pop. 16,000.

BARRANDE, JOACHIM (1799-1883), Austrian geologist; issued numerous papers on lower Palaeozoic fossils, and a great work on Bohemian Silurian system.

BARRANQUILLA (11° N, 74° 55' W.); city and port, Magdalena river, Colombia. Pop. 35,000.

BARRANTES, VICENTE (1829-98); Span. author and politician, wrote poems, satires, history, etc.

BARRAS, PAUL FRANÇOIS JEAN NICOLAS, COMTE DE (1755-1829), French statesman and prominent figure in the French Revolution, b. at Fox-Amphoux, Department of Var, June 30, 1755; died Jan. 29, 1829. He promptly took sides on the outbreak of the Revolution and became and remained an implacable enemy of the Bourbons. He was active in the attacks upon the Bastille and the Tuilleries, and voted as a member of the Convention for the death of the king. He was obnoxious, however, to Robespierre; and a struggle ensued between the two that ended in Robespierre being sent to the guillotine, while Barras on Feb. 4, 1795, was elected President of the Convention. It was in

this capacity that he overawed the Royalists who were seeking to overthrow the Convention. He employed Napoleon Bonaparte to quell the insurrection, and gave him the chief credit for the achievement. Realizing Bonaparte's genius and the heights to which he was destined to rise, Barras became a close ally of the latter. It was he who arranged the marriage of Napoleon and Josephine. In the meantime Carnot, the chief rival of Barras, had been ousted from the Directory (Sept. 4, 1797) and from that time until June, 1799, Barras was the most powerful political figure in France. The entrance of Sieyes into the Directory (June 13, 1799) marked the beginning of the end of Barras' influence and his downfall came when Napoleon overthrew the Directory by the coup d'etat of Nov. 9, 1799. Barras retired to Brussels but afterward received permission to reside in the south of France. His illuminating memoirs of the Revolution were published in 1895-96).

BARRATRY. (1) Act of stirring up quarrels or breaches of the peace. (2) Fraudulent act by a master-mariner against the owner of his ship, or cargo, such as scuttling the ship, embezzlement, etc. (3) In Scots law, the crime of a judge who accepts bribery.

BARRE, ISAAC (1726-1802), Brit. soldier of Fr. extraction; treasurer to navy, 1782.

BARRE, city of Washington co., Vermont, on the Central Vermont, the Montpelier and W. R. and the Barre and Chelsea railroads, seven miles southeast of Montpelier, the State capital. Its granite industry is one of the most important in the country, and on it the city's prosperity is based. It has a national bank, two savings banks, a public library, daily and weekly newspapers. Its waterworks are municipally-owned and operated. The first settlement was in 1788 and the town received a city charter in 1894. It is governed by a mayor and city council. Pop. 1920, 10,008.

BARREL, of wine, 31½ gal.; ale, 36 gal.; flour, 196 lb.; butter, 224 lb.; pork or beef, 200 lb. Dry barrel not a legalized measure; quantities must be stated in pounds or bushels.

BARREL-ORGAN, portable mechanical organ, played by turning a handle. This handle turns a wooden cylinder set with pins which raise the keys, thus admitting air from the wind-chest. Originally known as 'the Dutch organ,' the barrel-organ was first made in the Netherlands during the XV. cent. After its introduction into England it was frequently used in churches.

BARREN ISLAND (12° 6' N., 93° 45' E.), volcanic island, Bay of Bengal.

BARRÈS, MAURICE (1862), Fr. novelist; b. Charnes-sur-Moselle. His earlier writings are tainted with the decadent spirit, but in his later works he has shaken himself loose from what was more or less a literary pose and shown an ardent nationalism. The earlier stage was marked by the publication of *Sous l'oeil des barbares* (1888), *Un homme libre* (1889), and *La Jardin de Berenice* (1891). Much more wholesome and vigorous was his cycle of three stories, *Les deracines* (1897), *L'appel au soldat* (1900), and *Leurs figures* (1902). The most notable of his later writings were *Le voyage de Sparte* (1906), *La maîtresse servante* (1911), and *En Italie* (1912). In 1889 he was elected as a Nationalist to the Chamber of Deputies, and re-elected in 1906. In the latter year he was admitted to membership in the French Academy. His autobiography, *Vingt-cinq années de vie littéraire*, is informative and interesting. Consult further Kahn, *Symbolistes et décadents* (1902), and Huneker, *Egoists, a Book of Supermen* (New York, 1909).

BARRETT, JOHN (1866), American diplomat and publicist, b. at Grafton, Vt. He studied for a time at Vanderbilt University and graduated from Dartmouth in 1889. After teaching for a year at Oakland, Cal., he became associated (1890-94) with several important newspapers on the Pacific coast. In 1894 he was appointed Minister to Siam, and his services in that post earned him the special thanks of the President. During the Spanish-American War, he served as a special correspondent in the Philippines. He was appointed Minister to Argentina, 1903-04, to Panama, 1904-05, and to Colombia, 1906. His work in these capacities made him persona grata to South America, and in 1907 he was chosen by unanimous vote of 21 American Governments as Director-General of the Pan-American Union, an international organization maintained in Washington to promote amity, commerce and peace, between the countries of the Western Hemisphere. He resigned this position in 1920. He has written extensively on Asiatic and Latin American subjects.

BARRETT, LAWRENCE (1838-1891), American actor; b. Paterson, N. J. He made his stage debut at the age of 19 in *The French Spy*, at Detroit, Michigan. In 1856 he appeared in New York in *The Hunchback*, and a year later was in the cast supporting Charlotte Cushman. In the early part of the Civil War he served as captain in the 28th Massachusetts Infantry. His dramatic

ability had by this time been established and he was engaged by Edwin Booth to play *Othello* to his *Iago*. He then became the associate manager of the Varieties Theater in New Orleans, where he played the parts of *Richelieu*, *Hamlet* and *Shylock*. For several years following, he managed a theater in San Francisco. In 1870 he went with Booth, playing in alternate characters in Booth's Theater. He scored great dramatic triumphs in 1875 in the roles of *Cassius* and *King Lear*. In 1882 he produced *Francesca di Rimini* in Philadelphia and in 1887 began his first joint engagement with Booth in Buffalo. For many years he stood second only to Booth in the affection and esteem of the theater going public. His last appearance was on March 18, 1891.

BARRETT, WILSON (1846-1904), Eng. actor and dramatist; excelled in melodrama; wrote *The Sign of the Cross* (1895) and other plays.

BARRHEAD (55° 48' N., 4° 23' W.), burgh and town, on Levan, Renfrewshire, Scotland; weaving, engineering. Pop. 11,500.

BARRIAS, FELIX JOSEPH (1822-1907), Fr. historical painter; his bro., Louis Ernest (1841-1905), sculptor, has executed several public works at Paris.

BARRIAS, LOUIS ERNEST (1841-1905), Fr. sculptor; besides public monuments, has done groups on classical subjects, noted for strength and simplicity of handling.

BARRICADES, hastily improvised barriers composed of paving stones, wagons, trees, or other suitable materials thrown up as obstacles in street fighting. Raising barricades was the favorite Parisian method of commencing insurrection. Chief Days of the Barricades—May 12, 1588, used by League with a view to deposing Henry III. in favor of Duke of Guise; Aug. 27, 1648, first important manifesto of Fronde; during revolutions of 1830, 1848, and 1871. Barricades were used by Sinn Feiners in Dublin (1916), and repeatedly by Belgians during Ger. invasion of Belgium (1914).

BARRIE (44° 23' N., 79° 43' W.), tn., capital of Simcoe co., Ontario, Canada; summer resort; breweries. Pop. 6,400.

BARRIE, SIR JAMES MATTHEW (1860), Scot. novelist and dramatist; b. Kirriemuir; made his reputation with sketches and novels of Scot. life, *A Window in Thrums* (1889), *The Little Minister* (1891), etc., and plays of a delicate fancy and whimsical satire (e.g.) *The Admiral Crichton* and *Quality Street* (1903), the former perhaps the

finest comedy of recent days; *Peter Pan* (1904); *What Every Woman Knows* (1908); *Der Tag* (1914), a dramatic piece touching on the war; *Dear Brutus* (1918). *Echoes of the War* (1918); *Mary Rose* (1920), etc. Created baronet in 1913; elected lord rector of St. Andrews Univ. (1919).

BARRIENTOS, MARIA, coloratura soprano, b. at Barcelona, Spain. She was educated at the Conservatory of Music at Barcelona and at seventeen made her operatic debut in *Lakme* at Milan, Italy, afterward touring leading European countries and South America. She made her first appearance at the Metropolitan Opera House, New York, as *Lucia* in *Lucia di Lammermoor* in 1915. In addition to her work in Grand Opera she has toured the country extensively in concert.

BARRIER ACT, 1697, act of General Assembly of Scot. Church by which ecclesiastical bills must receive assent of presbyteries and General Assembly; named from forming b. to hasty legislation.

BARRIER REEF (c. 10° to 25° S., 144° to 152° 30' E.), chain of coral reefs outlining most of E. Queensland coast.

BARRIER TREATY (1709), treaty between England and United Netherlands, by which former guaranteed latter against Fr. aggression in return for guarantee against attack on Prot. succession in England.

BARRINGTON, GEORGE, Irish actor; real name Waldron; having served several long terms of imprisonment for pocket-picking, etc., was transported to Botany Bay, and became High Constable of Paramatta; pub. *Voyage to Botany Bay* (1801) and *History of New South Wales* (1802).

BARRIOS, JUSTO RUFINO (1835-85), president of Guatemala (1873-85); he rose to supreme military command under President Granados. Killed in war while invading San Salvador.

BARRISTER, a legal practitioner qualified to plead in the higher law courts of England, who must be a member of one of the Inns of Court. It is necessary in order to become a b., to pass a general examination, pay certain fees, and to keep twelve terms at one of the Inns, when, after further examination, it rests with the benchers of the Inn to call him to the Bar. When a barrister is made a King's Counsel (not less than 10 years after being called) he is said to 'take silk', and is then debarred by etiquette from undertaking certain minor forms of legal work. In Scotland a b. is known

by the title of advocate, and must be a member of the Faculty of Advocates, to which he is admitted on examination and on payment of certain fees.

BARRON, JAMES (1769-1851), American naval commander, b. in Virginia 1769. He was commissioned in the infant American navy as a lieutenant and a commodore in 1799. He did distinguished service in the Mediterranean, but in 1807 fell into governmental and popular disfavor because of the affair of the Leopard and the Chesapeake. He had sailed in command of the latter vessel on June 22 of that year, when he was halted by the British ship of war Leopard which claimed the right of search. This Barron refused to permit and the Leopard opened fire, killing three and wounding 18 others of the Chesapeake's crew. Barron, who had sailed with a green crew and with his deck heaped high with stores, could make no adequate defence and surrendered. For this he was court-martialed and suspended for five years without pay. On March 22, 1820, Barron fought a duel with Commodore Decatur and killed him. Decatur was the idol of the navy and Barron suffered in the popular esteem all his life, though he still remained in the service, where he held several important commands. At his death he was the senior officer of the navy.

BARROS, JOÃO DE (1496-1570), Portug. historian; wrote a romance of chivalric age, the *Chronicle of the Emperor Clarimundo* (1516), but is chiefly renowned for his *Decades*, setting forth the history of the Portuguese in Asia; was a noted literary stylist.

BARROSA (36° 20' N., 6° 10' W.), tn., Spain. British defeated French 1811.

BARROT, CAMILLE HYACINTHE ODILON (1791-1873), Fr. politician; famous as an advocate.

BARROW (52° 30' N., 6° 58' W.), river, Leinster, Ireland; joins Suir, Waterford harbor.

BARROW, ISAAC (1630-77), Eng. mathematician and divine; prof. of Greek in Cambridge; Gresham prof. of geometry; master of Trinity and vice-chancellor; author of numerous scientific works, his *Method of Tangents* influencing Newton's work.

BARROW, SIR JOHN (1764-1848), Eng. traveler and author; b. Ulverstone (Lancs.); spent much time in China as sec. to Lord Macartney; held post of 2nd sec. to Admiralty for 40 years; pub. *Travels in S. Africa* (1801-83), *Travels in China* (1804), *Voyage to Cochin-China* (1806), and history of modern Arctic expeditions, 1818, 1846.

BARROWE, HENRY (d. 1593), Eng. Puritan; was intimately associated with John Greenwood, leader of the Separatists, whose views he adopted, and was, in 1586, cast into the Fleet Prison at the instance of Abp. Whitgift. Here he remained until he was condemned and hanged, the charge being that of circulating seditious books. He wrote *A Brief Discovery of the False Church* (1591) and other books promulgating Separatist opinions.

BARROW-IN-FURNESS (54° 7' N., 3° 14' W.), county borough and seaport town, on Morecambe Bay, Lancs. England; of modern and rapid development; in vicinity are extensive iron-ore mines; large manufactures iron and steel; magnificent docks; engineering; wagon works. Pop. 80,000.

BARROWS (A.S. *beorh*, 'a little hill'), sepulchral mounds which are found throughout Europe and in many other parts of the world. In the Brit. Isles they are either round or oval in shape, and are formed of a stone-built inner chamber covered with earth, or sometimes of earth alone. In other instances they consist entirely of stone, several uprights, supporting a huge capstone; these in England are known as *cromlechs*, and in Brittany as *dolmens*. Sometimes the human remains were burned, and the ashes deposited in urns, but often actual bodies were buried, together with arms, drinking-vessels, and domestic animals belonging to the deceased. The b's of the Viking age were frequently very large, and it seems to have been a common custom to bury a warrior aboard his ship. The Gokstad ship, discovered in a burial mound in 1880, and now in the Christiana museum, is 78 ft. long, while the b. also contained the remains of a dozen horses, besides numerous other animals weapons, etc.

BARROWS, DAVID PRESCOTT (1873), American educator and scientist; b. Chicago. He graduated from Pomona College, Cal., 1894 and pursued post-graduate studies at the Universities of California, Chicago and Columbia. From 1900 to 1909 he taught in the Philippines, first as superintendent of schools at Manila and from 1903 to 1909 as director of education in the Islands. In 1910 he was appointed professor of education at the University of California, becoming professor of political science in that institution the following year. He has published *The Ethno-Botany of the Coahuila Indians* (1900), and *A Decade of American Government in the Philippines* (1915), besides monographs and reports on ethnological subjects.

BARROWS, HARLAN H. (1877),

BARROWS

American geographer; b. Armada, Mich. He graduated from Michigan State Normal College in 1896 and pursued postgraduate studies at the University of Chicago (1903-06). Since 1904 he has been connected with the University of Chicago's teaching staff. He was instructor in geology (1904-07), assistant professor of the same science (1908-10), associate professor of geography (1911-14), professor of geography since 1914.

BARROWS, JOHN HENRY (1847-1902), American clergyman and educator; b. Medina, Mich. He graduated at Olivet College in 1867; later studied at Yale College, Union and Andover Theological Seminaries and Göttingen, Germany. He held pastorates at Lawrence and East Boston, Mass., and from 1881 to 1896 was pastor of the First Presbyterian Church of Chicago. He was the organizer and first President of the World's Parliament of Religions, held at Chicago, in 1893. Following a lecture tour of two years through India, he was called to the presidency of Oberlin College in 1898. He was an eloquent preacher and a prolific writer. Among his publications are: *The Gospels Are True Histories* (1890), *I Believe in God* (1891), *Life of Henry Ward Beecher* (1893), *The Christian Conquest of Asia* (Morse Lectures, 1899).

BARROW-UPON-SOAR (52° 46' N., 1° 9' W.), village, Leicestershire, England; industries, stone and cement works, stocking manufacture.

BARRUS, CLARA (1864); American physician, b. Port Byron, N. Y., Aug. 8, 1864. She studied medicine and was for a time an assistant physician in the Homeopathic State Hospital, at Middletown, N. Y. Her health was threatened by the unpleasant nature of her surroundings, and having become acquainted with John Burroughs, the famous naturalist, she accepted an offer to become his secretary. She held this post for many years, and on his death was made by his will the biographer and literary executor of her employer. He also bequeathed to her all royalties from his writings and gave her a life interest in his estates, Slabades and Woodchuck Lodge. These properties were later turned over by her to an organization whose design was to make them national shrines to which the naturalist's admirers could pay pilgrimage. Her publications include *Retreat of a Poet Naturalist* (1905); *Nursing the Insane* (1908), and *John Burroughs, Boy and Man* (1920).

BARRY (Fr. *barre*, barred); term in heraldry for field traversed by horizontal bars of different colors.

BARRY

BARRY (51° 24' N., 3° 16' W.), seaport, Glamorganshire, S. Wales, opposite island of B., Bristol Channel; docks accommodate largest vessels afloat; enormous quantities of coal shipped. Pop. 36,500.

BARRY (56° 31' N.; 2° 45' W.), village, Forfarshire, Scotland; annual military and territorial camp.

BARRY, SIR CHARLES (1795-1860), Eng. architect; designed Houses of Parliament, Bridgewater House, and many churches and private mansions; also Royal Institution (1824) and Athenæum (1836) at Manchester; was knighted (1852); buried in Westminster Abbey.

BARRY, ELIZABETH (1658-1713); Eng. actress; won high praise from Dryden and Cibber, and was particularly famous for her performances in Otway's plays.

BARRY, JEANNE BÉCU, COMTESSE DU (1741-93), mistress of Louis XV.; fled to England at outbreak of Revolution, but returned and was guillotined during Terror.

BARRY, JOHN (1745-1803), American naval officer; b. Wexford, Ireland. He entered the American navy at the outbreak of the Revolution and commanded the brig Lexington and later the frigate Effingham. While in charge of the latter vessel, then lying near Philadelphia, he made a daring raid and captured important stores and munitions from the British. As commander of the *Reliance* he took a number of valuable prizes including the British warships *Atalanta* and *Trepassy*. He supervised the building of the frigate *United States* of which he afterwards became the commander. On the foundation of the U. S. navy in 1794 he became its first senior officer. A statue in his honor stands in Independence Square, Philadelphia.

BARRY, RICHARD (1881), American author and journalist; b. in Eau Claire, Wis. His first newspaper work was on the Milwaukee Sentinel. At various times between 1898 and 1904 he was connected with the Buffalo Inquirer, Los Angeles Times and San Francisco Bulletin. During the Russo-Japanese War he served as war correspondent for Collier's Weekly, Century Magazine and the Westminster Gazette. He was on the staff of Pearson's Magazine (1910-1914) and became connected with the New York Times Sunday Magazine in 1914. Among his writings are: *Sandy of the Sierras* (1904); *The Searchlight* (drama, 1908); *Brenda of the Woods* (1914), and *Fruit of the Desert* (1920).

BARRY, SPANGLER (1719-77), Irish actor; b. Dublin; in leading Shakespearean roles became a rival of Garrick, over whom he possessed the advantage of a tall and handsome person. His second wife, Ann Street Barry (d. 1801), an actress, was considered the superior of Mrs. Siddons in some characters.

BARRY, THOMAS HENRY (1855-1919), American military officer; b. New York. He graduated at the U.S. Military Academy in 1877. In several Western campaigns he won renown as an Indian fighter and rose rapidly through the various grades of the service. He was with the Relief Expedition to China at the time of the Boxer Rebellion in 1900 and also served in the Philippines. He was made Brigadier-General in 1903 and Major-General in 1908. In 1907-09 he commanded in Cuba, and was superintendent of West Point 1910-12. At the time of his death he was Commander of the Department of the East.

BARRYMORE, ETHEL (MRS. RUSSEL GRISWOLD COLT) (1879), American actress; b. Philadelphia, Pa. She came of a theatrical family, her parents being Maurice and Georgiana (Drew) Barrymore, while her uncle is John Drew. She was educated at the Convent of Notre Dame, Philadelphia, and made her stage debut in John Drew's company in 1896. Her rare dramatic gifts soon carried her to the forefront of her profession. She appeared in leading roles with Henry Irving. Her first appearance as a star was in *Captain Jinks* in 1900. In *The Doll's House*, 1905; and in *Alice-Sit-By-the-Fire* she established her reputation as one of the foremost American actresses. That reputation was maintained and augmented by her performance in *Declassée*, *Clair de Lune* and *Rose Bernd* (1922). An event of note in the dramatic world was her appearance as *Juliet* in *Romeo and Juliet* (1923).

BARRYMORE, JOHN (BLYTHE) (1882), American actor. He made his stage debut as *Max* in *Magda* at Cleveland's Theater, Chicago, Oct. 31, 1903. In 1905 he played in London, and later made a tour of Australia with William Collier. He appeared later in *The Boys of Company B*, *The Fortune Hunter*, *The Princess Zim Zim* and *Are You a Mason*. He won popular favor in film dramas, of which the most notable was *Dr. Jekyll and Mr. Hyde*, in which his portrayal of the dual personalities in Stevenson's story was a masterpiece of acting. In 1922 he returned to the speaking stage as *Hamlet*, in which role he scored a pronounced success.

BARRYMORE, LIONEL (1878),

American actor. His stage debut was made in 1893 in *The Rivals*, in which his grandmother, Mrs. John Drew, was playing the part of *Mrs. Malaprop*. In 1897 he appeared in *Cumberland '81*, and two years later played with J. A. Herne in *Sag Harbor*. His art matured steadily, and in *Peter Ibbetson*, 1917; and *The Copperhead*, 1918, he achieved marked successes. He scored heavily also as *Neri* in *The Jest*, 1919, and in the title role of *Macbeth*, 1921.

BARRYMORE, MAURICE (1847-1905), the stage name of Herbert Blythe, American actor, was b. in India and educated at Harrow and Oxford, England. He studied for the Civil Service, but his health broke down, and he later tried the law. This latter calling, however, was not to his taste and he went on the stage. He made a tour of the English provinces and in 1875 came to America, playing first in Boston, and obtaining considerable success in *The Shaughraun*. Not long afterwards he married Georgiana Drew, a member of the famous theatrical family. In 1882 he became leading man to Madame Modjeska, the famous Polish actress, and later played with Mrs. Langtry, Mrs. Bernard Beere and Olga Nethersole. In 1899 he played with Mrs. Fiske in *Becky Sharpe*, being extremely successful in the role of *Rawdon Crawley*. He was also leading man with Mrs. Leslie Carter in *Belasco's Heart of Maryland*. He was the author of a play, *Nadjeska*, which Madame Modjeska produced in 1884. In 1901 Barrymore suffered a complete mental collapse, and went into retirement, dying four years later. As an actor he was endowed with much romantic dash and melodramatic fervor, having a natural manner, picturesque bearing and very handsome presence. He had natural endowments greater than many a modern star actor, but he nevertheless seemed destined to play always in support of others, his attempts to stand alone usually ending with comparatively little success.

BARS, dist., Czecho-Slovakia, crossed about center by 48° 30' N., 18° 30' E.; gold, silver, copper, iron, lead, antimony, cereals, wine. Area, 1,031 sq. m. Pop. 164,800.

BARSI (18° 12' N.; 75° 43' E.), town, Sholapur, Bombay Presidency, India. Pop. 24,000.

BAR-SUR-AUBE (48° 17' N.; 4° 38' E.), district and town, Aube, France; flour. Pop. 4,600.

BAR-SUR-SEINE (48° 6' N.; 4° 19' E.), town, Aube, France; glass, brandy; French defeated Austrians, 1814. Pop. 3,300.

BART, JEAN (1651-1702), Fr. naval officer; s. of a fisherman; b. Dunkirk; first served in Dutch navy under De Ruyter, later entered Fr. service; by sheer force of character and bravery rose to highest rank. He was no respecter of persons, and many stories of his blunt humor are recorded.

BARTHELEMY SAINT-HILAIRE, JULES (1805-95), Fr. philosophical writer and republican statesman.

BARTHOLDI, FRÉDÉRIC AUGUSTE (1834-1904), Fr. sculptor; Statue of *Liberty* (New York harbor) and *Lion of Belfort* are among his works.

BARTHOLOMEW FAIR, fair held in Smithfield, London, on St. B.'s Day, from 1133 to 1855. It was a vast national market, opened by the Lord Mayor, and lasted for a fortnight.

BARTHOLOMEW, JOHN (1831-93), Scot. cartographer; b. Edinburgh; founded the Edinburgh Geographical Institute, an organization of world-wide fame in cartographical work.

BARTHOLOMEW, MASSACRE OF ST. (Aug. 24, 1572), the name given to the wholesale slaughter of Huguenots in Paris, by order of Charles IX., which took place on St. Bartholomew's Day. The massacre was planned by the queen-mother, Catherine, who feared and hated the half-presumptive to the throne, Henry of Navarre, the hope of the Protestants. The effect was to nerve and strengthen Protestantism. See *FRANCE (History)*.

BARTHOLOMEW, ST., one of the twelve Apostles; said to have been flayed alive, and then crucified head downwards; festival observed on Aug. 24.

BARTHOUS, LOUIS (1862); Fr. ex-minister and author. As minister of justice (1913) he helped to reveal the Caillaux scandals, and proposed the three years' military service law. Author of *Vers la Victorie*, etc.

BARTIZAN, a small, overhanging, battlemented turret, near a gateway, usually furnished with arrow-slits.

BARTLESVILLE, a city of Oklahoma. Center of important petroleum fields; zinc smelters. Rapid growth in recent years. Pop. (1920) 14,417.

BARTLETT, FREDERICK ORIN (1876), writer, was born at Haverhill, Mass., and educated abroad under private tutors, and at Andover, N. H., and Harvard. For some little time he was engaged on newspaper work in Boston,

working first for the Boston Record and then for the Boston Herald. His published works include *Mistress Dorothy*, *Joan of the Alley*, *The Web of the Golden Spider*, *The Lady of the Lane*, *The Triflers*, and many short stories contributed to magazines.

BARTLETT, JOHN (1820-1905), Amer. publisher and compiler; member of Boston bookselling and publishing firm; memorable as the compiler of *Familiar Quotations*, first pub. 1855; also pub. an exhaustive *Shakespeare Concordance* (1894).

BARTLETT, JOHN RUSSELL (1805-86), Amer. author and statesman; b. Providence, Rhode Island, became Sec. of State for Rhode Island; edit. *Records of the Colony* (1636-1790); is chiefly remembered for his *Dictionary of Americanisms* (1848).

BARTLETT, MURRAY (1871), university president, was b. at Poughkeepsie, N. Y., and educated at Harvard. He later graduated from the General Theological Seminary and became curate of the Cathedral of St. Mary and St. John, Manila, and was a member of the board regents of the University of Philippines, being the first president and organizer of the latter. He is a founder of the Graduate School of Tropical Medicine and Public Health. He is the author of *A University for the Filipino*, published in 1911. Since 1919 he has been president of Hobart and William Smith Colleges, Geneva, N. Y.

BARTLETT, PAUL WAYLAND (1865), sculptor, was b. at New Haven, Conn., and educated in the public schools at New Haven and Boston. He became interested in art while still a boy, and studied sculpture under Frémiet. At the age of 14 he exhibited in the Salon a bust of his grandmother, and at 15 he entered the Ecole des Beaux Art, where Cavaller was his teacher. Seven years later he attracted attention at the Salon with his *Bear Tamer* which is now in the Metropolitan Museum in New York. He was a member of the International Jury of Awards in the Paris Exposition of 1899 as well as that of 1900. His chief works include a statue of General Joseph Warren in Boston, an equestrian statue of Lafayette in the Louvre Square in Paris (a gift to France from the school children of the United States), statues of Columbus and Michel Angelo in the Congressional Library, Washington, and six statues on the front of the New York Public Library. He is represented in the Boston Museum, Philadelphia Academy of Design, Chicago Art Museum, Luxembourg Gallery, Paris, and in the Museum of Decorative Art, Paris.

BARTLETT, ROBERT ABRAM (1875). Arctic explorer, was *b.* in Newfoundland and educated at Brigus High School and the Methodist College, St. John's Newfoundland. In 1905 he passed his examination for 'Master of British Ships,' but he began his career as explorer a few years earlier, wintering with Peary at Cape D'Urville, Kane Basin in 1897-8. A few years later he went on a hunting expedition in the Hudson Strait and Bay, and for four years was the captain of a sealer off the Newfoundland coast. He later commanded the 'Roosevelt,' and took an active part in Peary's expedition to the North Pole, reaching the 88th parallel. He commanded a private hunting expedition to Kane Basin in 1910 and a little later served with the Canadian government Arctic Expedition as captain of the 'Karluk,' which was crushed by ice in 1914. With seventeen people he reached Wrangel Island, and leaving fifteen of them there, with one Eskimo he crossed the ice to Siberia, returning with a rescue party to Wrangel Island in 1914. A year later, the party reached Nome, Alaska, with thirteen survivors. He commanded the third Croker Land Relief Expedition to North Greenland. In 1917 he became marine superintendent of the Army Transport Service in New York. He is the winner of the Hubbard gold medal of the National Geographical Society, the silver medal of the English Geographical Society, etc.

BARTLETT, SAMUEL COLCORD (1817-1898), was *b.* at Salisbury, N. H., and educated at Dartmouth College. He became a teacher there and later at Andover Theological Seminary. For some time he had charge of a church at Monson, Mass., but subsequently went to Western Reserve University, Ohio, as professor of philosophy. He afterwards had charge of a church in Manchester, N. H., and later in Chicago. In 1858 he became professor of Biblical literature in Chicago Theological Seminary, remaining there until 1873. Four years later he was appointed president of Dartmouth College, where he remained until he resigned the post in 1892. He is the author of *From Egypt to Palestine, Sketches of Missions of the American Board*, etc.

BARTOLI, DANIELLO (1608-85), Ital. Jesuit; wrote history of Society of Jesus in 6 vols. (Rome, 1650-73).

BARTOLI, TADDEO DI (c. 1363-1422), Sienese painter; chief work: series of frescoes in chapel of municipality, Siena.

BARTOLINI, LORENZO (1777-1850), Ital. sculptor; produced, among

other works, *Charity, Hercules and Lichas, Faith in God*, and bust of his patron Napoleon.

BARTOLOMMEI, MARQUIS FERDINANDO (1821-69), Ital. patriot; associate of Cavour and Mazzini; organized Tuscan contingent for war of Italy against Austria, and secured expulsion of Grand Duke from Florence.

BARTOLOMMEO DI PAGHOLA, FRA (1475-1517), Ital. artist; famous for his magnificent altar-pieces; also for his friendship with Savonarola and Raphael.

BARTOLOZZI, FRANCESCO (1725-1815), Ital. engraver; *b.* Florence; studied at Rome and Venice; came to London (1764), where he spent a considerable portion of his life, but *d.* in Portugal. He contributed to *Boydell's Shakespeare Gallery*.

BARTON, ANDREW (*d.* 1511), Scot. merchant; regarded in England as bold pirate; slain by English in naval engagement; subject of ballad.

BARTON, BENJAMIN SMITH (1766-1815), Amer. naturalist; prof. at Philadelphia; pres. of Amer. Philosophical Soc.

BARTON, BRUCE (1886), author and editor, was born at Robbins, Tenn. and educated at Amherst. He became managing editor of the *Home Herald* of Chicago, and later of *Housekeeper*. He then joined P. F. Collier and Son as sales manager, and in 1914 became editor of *Every Week*. Since then president of an Advertising Agency. Amongst his published works are *The Resurrection of a Soul, More Power to You*, and *The Making of George Groten*.

BARTON, CLARA (1830-1912), Amer. philanthropist; app. head of hospital department in Amer. army, 1864; aided Red Cross Society in Franco-German war, and has since done much personal field work; became pres. of newly established Amer. Red Cross Society, 1881.

BARTON, ELIZABETH (c. 1506-34), the 'Nun' or 'Maid of Kent'; forbade divorce of Henry VIII., prophesying his dethronement; executed at Tyburn.

BARTON, JAMES LEVI (1855), clergyman, was born at Charlottetown, Vt., and educated at Middlebury College, later graduating from Hartford Theological Seminary. He was ordained a Congregational minister in 1885, the same year becoming a missionary at Harpoot, Turkey. For some years he was a professor in the Mission Theological Seminary, and in 1893 was President of the Euphrates College in Har-

poet. He has served on deputations to Japan, China, Ceylon and India. Among his published works are *The Missionary and his Critics*, *The Unfinished Task of the Christian Church*, *Daybreak in Turkey*, *Human Progress Through Missions*.

BARTON, WILLIAM ELEAZAR (1861), son of Dr. Jacob and Helen Barton. Graduated from Berea College in 1885; Oberlin Theological Seminary in 1890. Given LL.D. degree by Knox College in 1913. Ordained in Congregational Ministry in 1885. Pastor Shawmut Congregational Church, Boston, 1893-99, and since 1899 minister of First Church, Oak Park, Illinois. Associate Editor *Bibliotheca Sacra*; editor-in-chief pastor's department of the *Advance*, 1913-17. Lecturer on Applied Practical Theology, Chicago Theological Seminary, 1905-1909, and on ecclesiastical law, since 1911. On staff of *Youth's Companion*, 1900-1917. President Trustees Union Theological College since 1916. Author of numerous works of theology and Bible history, biography and fiction. Amongst other *Psalms are the Story* (1898); *The Prairie Schooner* (1900); *Consolation* (1901); *The Continuous Creation* (1902); *Jesus of Nazareth: His Life and the Scenes of his Ministry* (1904); *The History and Religion of the Samaritans* (1906); *Life of Joseph E. Roy* (1908); *Bible Classics* (1911); *Congregational Creeds and Covenants* (1917); *The Soul of Abraham Lincoln* (1919); *The Paternity of Abraham Lincoln* (1920); *the Life of Clara Barton* (1921). Editor of the *Young Folks' Bible Library*.

BARTTELOT, EDMUND MUS-GROVE (1859-88), Eng. soldier and explorer; served in Afghanistan and Egypt; present at Tell-el-Kabir (1882) and Suakin (1883); breveted major after Gordon Relief Expedition; finally joined H. M. Stanley's force for relief of Emin Pasha (1887); shot by an Arab (1888); subject of painful controversy on Stanley's return.

BARU, fibrous material obtained from leaves of E. Indian sago-palm and used in place of wool for cushions, etc.

BARUCH, THE APOCALYPSE OF, consists of a VI.-cent. Syriac MS. discovered by Ceriani in the Milan library in 1866, of which he produced a Latin trans. B. is said to have been companion and sec. of Jeremiah, and his work includes the prayer of the captives in Babylon, a dissertation of wisdom, and songs celebrating the return from captivity; see Charles, *Apocalypse of B.* (1896).

BARUCH, BERNARD MANNES, son of Simon and Isabel Baruch. Graduated from College City of New York, 1889. For many years member of New York Stock Exchange. Appointed in 1916 by President Wilson, member of Advisory Committee of Council of National Defense. Chairman of Committee in charge of raw materials for War Industries Board, also member of committee in charge of all purchases for the Allies. American delegate in economics and reparation. Economic adviser for American Peace Commission. Trustee of College of City of New York. Author, *Making of Economic and Reparation Sections of Peace Treaty* (1920).

BARUCH, SIMON, American physician (1840-1921), son of Bernard and Teresa Baruch. He was educated at the Gymnasium, Posen, Germany. Graduated doctor of medicine by the Medical College of Virginia, in 1862. Served as surgeon in Confederate Army under command of Gen. R. E. Lee, 1862-65. Captured at Gettysburg. Practised medicine at Camden, S.C. 1865-81. Came to New York City and practised as consulting physician in chronic cases. Author, *Uses of Water in Modern Medicine*; *The Principles and Practice of Hydrotherapy*. Hospital erected in his honor at Camden, S.C. in 1913.

BARUGO (11° 15' N., 124° 50' E.); coast town, island Leyte, Philippine Islands; hemp. Pop. 12,000.

BARUS, CARL, American physicist (1856), son of Professor Carl and Sophia Barus. Educated at Columbia University, 1874-1876; University of Wurzburg, Germany, 1876-80; Ph.D. 1879; LL.D. Brown University, 1907; and Clark University, 1909. Physicist to U.S. Coast Survey, 1880-92. Professor of Meteorology in U.S. Weather Bureau, 1892-93, physicist Smithsonian Institution, 1893-95. Professor of Physics since 1895. Author, *The Electrical and Magnetic Properties of the Iron Carburets*, (1885); *Compressibility of Liquids*, (1892); *Condensation of Atmospheric Moisture*, (1895); *Condensation Induced by Nuclei and by Ions* (1907); *Interference of Reversed and Non-Reversed Spectra*, 4 vols., 1916-19.

BARYE, ANTOINE LOUIS (1796-1875), Fr. sculptor; in reproductions of animal life was the greatest modern Fr. master; exhibited *Theseus and the Minotaur* (1847), *Lapiha and the Centaur* (1848), besides executing many figures for the Tulleries, gardens, and public buildings.

BARYTES, HEAVY SPAR (BaSO₄), orthorhombic mineral occurring in met-

alliferous veins; known as *cawk* in Derbyshire lead-mines; sp. gr. 4.5; used as 'permanent white' pigment.

BARYTOCALCITE, BaCaCO_3 , monoclinic white transparent crystals, found only at Alston Moor, Cumberland, England.

BASALT, igneous (volcanic) rocks with dark cleavage surfaces, weathering to turbid shades; composition varied, chiefly felspars, olivine, augite, black hornblende, biotite, and nepheline, together with grains of magnetite; many are characterized by columnar jointing, producing picturesque conformations, of which Staffa and Giant's Causeway are well-known examples.

BASCINET, BASINET, BASNET, light peaked helmet, worn with or without a movable front, in common use during reigns of Edward I., II., III., and Richard II.

BASE (Chemistry), a compound which will unite with acids to form salts. All metallic oxides are b's, and are hence called *Basic Oxides* to distinguish them from non-metallic oxides, which, being acid-forming oxides, are called *Acid Oxides*.

BASEBALL, the 'national game' of the United States, had its origin in the English game 'rounders,' to which it still bears a close resemblance. It was first played in Philadelphia, in 1838, being then known as 'town ball.' It first became popular in New York, where local clubs were formed and games contested in a large field situated over the river on a site where Hoboken, N. J., now stands. From New York the enthusiasm for the game gradually spread over the country, and in 1857 a national conference of ball clubs was held to formulate a set of standard rules, so that clubs from different parts of the country might play together. In May of that year a National Baseball Association was founded, and in the following year the first real series between organized baseball teams was played on the old racecourse in Flushing, Long Island, N.Y., though as yet all the players were amateurs. The rules of the game were still very much undeveloped, compared to those of the present day. The ball must consist of a rubber ball, weighing $2\frac{1}{2}$ ounces, covered over with yarn and leather enough to bring it up to $6\frac{1}{2}$ ounces, and it must be $10\frac{1}{2}$ inches in circumference. The bat could be any length, but must be $2\frac{1}{2}$ inches in diameter. The ball could only be pitched; there must be no throws or jerks. The pitcher could take any number of steps before pitching. Until this time there had been

no thought of charging admission within enclosed fields for spectators, but in 1863 the Union Ball Ground was opened in Brooklyn, N.Y., where teams were invited to play and spectators were charged admission, the proprietor at first pocketing all the profit, but later dividing with the players. In 1869 the first salaried baseball team was formed, the 'Red Stockings' of Cincinnati, Ohio. This team began touring the country, playing local amateur clubs, and, of course, winning all the games. In 1871 the 'National Association of Professional Baseball Players' was formed, which remained in the field without a rival until 1890, when the 'American League' was founded. Since then the professional aspect of the game has developed strongly, together with the corruption inevitable with its commercialization. This evil tendency finally culminated in a scandal, in 1921, as a result of which Judge Landis, of Chicago, was appointed as 'national dictator' of the game, with the power to fine and suspend players for infringement of the national rules. The result has been such a renewal of confidence on the part of the public that other fields of commercialized amusements, such as the motion picture industry, have adopted similar measures. The game since then has grown more popular than ever, as evidenced by the gate receipts, which broke the record in 1922. The World's Series of 1922 was played between the New York National League and the New York American League Clubs, respectively pennant winners in their leagues. The National League Club (Giants) won in four games to none, with the second contest ending in a 3-3 tie due to darkness, the attendance averaging between 36,000 and 38,000.

BASEDOW, JOHANN BERNHARD (1723-90), Ger. educationist, disciple of Rousseau; wrote books embodying Rousseau's theory of education, and established institute at Dessau.

BASEL.—(1) Canton in N.W. Switzerland; divided (1833) into Rural (chiefly agricultural, with 56 sq. m. forest, 1,440 ac. vineyards) and Urban Basel. Total area, 177 sq. m.; pop. 209,200. (2) Tn., cap. of above ($47^{\circ} 34' \text{ N.}$, $7^{\circ} 35' \text{ E.}$); divided by Rhine into Great (residential and professional) and Little (industrial—silk ribbons) Basel. Cathedral (14th cent.), with tomb of Erasmus; town hall and univ. (15th cent.); flourishing transit trade; important ry. st. Pop. 132,600.

Council of Basel (1431-43), the last of three reforming Councils held in 15th cent., was summoned by Pope Martin V., and met under his successor, Eugen-

ius IV. The Council was bent on reconciliation with Hussites, and though the Pope at first ratified its decisions, he became in the end its bitter opponent. The Council elected an antipope, Felix V. (1439), and schism was not ended till death of Eugenius and resignation of Felix (1449). The new Pope, Nicholas V., gave a quasi-confirmation to acts of the Council; but though these carried a measure of authority in France and Germany, they were practically ignored by succeeding popes. Its decisions are not accepted by canonists.

BASHAHR, trib. hill-state, Punjab, India (31° 36' N., 78° 20' E.); under Brit. administration. Area, 3,820 sq. m.; pop. 85,000.

BASHAN (32° 45' N., 36° 15' E.), extensive district, Palestine, E. of Upper Jordan; inhabited by Amorites; their king, Og, was conquered by Israelites; territory allotted to half-tribe of Manasseh; volcanic in origin; proverbially fertile; men, also cattle, remarkable for large stature.

BASHI-BAZOUK.—(1) Turk. cavalry force consisting of irregulars. (2) Turk. mounted police.

BASHKIREs, BASHKIRs, people of Urals, Russia, of Tartar speech, Muhammadan religion.

BASHKIRTSEFF, MARIE (1860-84), Russ. author and artist of precocious talents; spoke four languages, read Gk. and Lat. authors in original, skilled musician, and achieved considerable eminence as a painter in Paris; chiefly remembered by remarkable *Journal* (begun in childhood and continued throughout her life), pub. 1887 (Eng. trans., 1890).

BASIL I. (d. 886), Byzantine emperor, called 'the Macedonian,' from birthplace; became sole emperor, 867; revived Byzantine power; extended his territory and codified the laws.

BASIL II. (c. 958-1025), Byzantine emperor, called 'Slayer of the Bulgarians'; his great-great-grandson of Basil I. He and his bro. Constantine succ. their f., 963, as joint-emperors; B. made himself real master of army, and annexed Armenia and Bulgaria.

BASIL THE GREAT, ST. BASIL (329-79), bp. of Caesarea, in Cappadocia, one of most eminent Gk. Fathers; involved in most of religious controversies of time, and resolute opponent of Arianism. B. founded a monastic order, since known as *Basilian Monks*, which brought about a great change in the ideal of the religious life. He was dissatisfied

with the eremitical life, and so established the cenobitical, believing that work and usefulness could be carried on in conjunction with saintliness and austerity. Consequently the *Rules of St. Basil* provided for common daily prayers, common meals, and hard field work, while the austerities of this life were scarcely less than those practised by the Eremites. The Rules of St. Basil have been the inspiration of monasticism in the Gk. Church, and there can be no doubt that St. Benedict's Rule owes much to them.

BASILICA.—(1) Gk. digest, in 60 books, of Justinian's laws of the Byzantine empire, pub. in the early part of X. cent. (2) Roman building in which public meetings and legal tribunals were held. It consisted usually of an oblong nave, with side aisles, divided by colonnades, latter supporting a gallery. At one end of the building was a semi-circular apse, with a dais, or raised seats, for the judges, or for other persons officiating in the business of the meeting. The first such building was the B. Porcia erected at Rome, 184 B.C., by Cato 'the Censor.' B's continued to be built, in Rome and other Ital. towns, down to the end of the III. cent. A.D. The name was afterwards given to buildings built upon a similar plan for Christian worship, which were known as 'basilican churches.'

BASILICATA (40° 25' N., 16° 10' E.); division of S. Italy, forming province Potenza.

BASILIDES (fl. 117 A.D.), Gnostic philosopher who lived at Alexandria during the rule of the Emperors Trajan and Hadrian.

BASILISK, imaginary malignant monster of the ancients (*cockatrice*): genus of lizards.

BASIN, BASON, a bowl; land drained by a river and tributaries; rock beds with a centro-clinal dip; depressions, often occupied by lakes, created glacially, by solution of underlying strata, or by movements of the earth's crust.

BASIN, THOMAS (1412-91), Fr. bp. and historian; app. bp. of Lisieux, 1447, which position he later renounced; cr. abp. of Caesarea by Sixtus IV.; conspicuous public figure during troubled period; wrote valuable history of Charles VII. and Louis XI.

BASINGSTOKE (51° 16' N., 1° 5' W.), town, Hampshire, England; connected with river Wey by canal; has Roman remains and ruined castle. Pop. 11,500.

BASKERVILLE, CHARLES (1870-

1922), an American chemist, son of Charles and Augusta Baskerville. Educated at University of Mississippi in 1886-87. Graduated from University of Virginia, 1890. Studied farther at Vanderbilt University, 1891, and University of Berlin, 1893. Ph.D. degree from University of North Carolina, 1894. Assistant professor and professor of Chemistry, University of North Carolina, 1894-1900; Professor of Chemistry College of City of New York since 1904. Discovered the chemical elements of carolinium and berzelium. Carried on investigations on chemistry of anaesthetics. Author, *School Chemistry* (1888); *General Inorganic Chemistry* (1909); *Qualitative Analysis* (with L. J. Curtman).

BASKERVILLE, JOHN (1706-75). Eng. printer; greatly developed art of typography; became printer to Cambridge Univ. (1758), and was noted for his editions of the Bible, Prayer Book, and Latin classics.

BASKET, plaited receptacle for carrying small articles; also protection for hand when fighting or fencing. B. work was primitive art; material—willow-wands, reeds, bamboo, Span. cane, split wood. These are soaked for some time, dried out of doors, used whole or split with a special b.-maker's instrument ('the splitter'). In plaiting, the bottom is first woven, and into it the sharpened ends of other pieces are plaited and turned up at the edges to form the sides; into these upright pieces are woven horizontal pieces over which they are at last turned down. Sharpened stakes, pushed down centers of the sides and fastened there, are woven together to form handle.

BASOCHE, association of clerks of Paris, in existence XIV. cent. till Revolution; elected a king, etc.; among privileges was that of producing morality plays, *scies*, etc.; scurrilous *soties* (satirical farces) led to loss of their theatre, 1582.

BASQUES, a race of people inhabiting region at W. end of Pyrenees, including part of department of Basses-Pyrénées in France, and provinces of Biscaya, Guipuzcoa, and Alava, and part of Navarre in Spain. They retained practical independence in Spain until 1876, in France until time of Revolution. They are of good height and excellent physique, fair-skinned, and dark- or fair-haired; are brave, intelligent, hard-working, extremely religious, and characterised by great pride of birth; have long been famous as seamen and whalers. Many ethnologists hold they are descended from Iberians, the earliest-

known inhabitants of the peninsula; while their language, *Euscara* or *Euscara*, is polysynthetic and is related to no other tongue known to philologists, whose researches have so far yielded no definite results. Grammars have been compiled by Van Eys, Prince Lucien Bonaparte, and others, and the language is said to have eight dialects. Lit. is modern and comparatively unimportant, consisting chiefly of historical and religious plays, proverbs, and songs.

BASQUE PROVINCES (43° N., 2° 30' W.), district, N.E. Spain, on Bay of Biscay, comprising three provinces, Viscaya, Guipuzcoa, Alava; transverse by Pyrenees; fertile soil; iron-mining center; area, 2,739 sq. miles. Pop. 671,500.

BAS - RELIEF, BASSO - RELIEVO, term used in sculpture for designs in low relief.

BASS, male voice of lowest register; low-pitched musical instruments; low notes in harmony; kind of bag made of plaited straw or fibre.

BASS, JOHN FOSTER (1866); an American war correspondent, son of Perkins and Clara Foster. Graduated from Harvard in 1891. LL.B. in 1894, admitted to New York bar in 1894. Reported military operations in 1895 in Egypt with English and Cretan insurrection; in 1896 Armenian massacre; in 1897 Cretan rebellion and Greek War; in 1899 Philippine insurrection; in 1900 Boxer rebellion and march of Allies to relief of Peking; in 1904 Russo-Japanese War; with Allied armies in Europe 1915-1917; American and French battle fronts in 1918. Attended Peace Conference, Paris, and was made official representative of American Press with mission to Poland, 1919. Author, *The Peace Tangle*, 1920; *The Balance Sheet of Civilization*.

BASS, WILLIAM (d. 1720); Eng. brewer; founder of Messrs. Bass, Ratcliff, & Gretton Ltd., a Burton-on-Trent firm of world-wide reputation.

BASSA, prov. N. Nigeria (7° 30' N., 7° 35' E.); forests, rubber trees; southern part unexplored; chief center, Dekina. Area, c. 7,000 sq. km.; pop. c. 205,000.

BASSAM, tn., Ivory Coast, Fr. W. Africa (5° 16' N., 3° 44' W.), seat of government till 1900; ivory, gold dust, palm oil. Pop. 2,500.

BASSANO (45° 46' N.; 11° 43' E.); cathedral city, Vicenza, Italy; majolica. Pop. 6,500.

BASSANO, JACOPO DA PONTE (1510-92), Ital. artist; his altarpiece of

The Nativity at Bassano, his birthplace, was highly praised by Lanzi.

BASSARIDÆ, species of carnivores whose dentition generally resembles canine; racoon-like in appearance.

BASSARAB, BASSARABA, name of Rumanian dynasty ruling over Wallachia till 1658; XVI. and XVII.-cent. princes famous as builders and scholars.

BASS CLARINET, larger musical instrument than ordinary clarinet, and an octave lower in pitch; invented by Gresner, a Dresden maker, in 1793.

BASSEIN (16° 46' N.; 94° 48' E.). (1) mountainous district, Lower Burma; fertile; important center of rice trade; area, 4,127 sq. miles. Pop. 391,427. (2) town, in B. district. Pop. 32,000.

BASSELIN, OLIVER (1400-50). Fr. poet; fuller by trade; b. Val-de-Vire, Normandy; famous for drinking-songs, called *Vaux-de-Vire*. He forms subject of poem by Longfellow.

BASSES, SEA - PERCHES (*Serranidae*), perch-like bony fishes, marine, and found in all seas, although a few ascend rivers. The commonest Brit. form is the Basse (*Morone labrax*), which may weigh 20 lb., but the related Jew Fishes of tropical seas may be 6 ft. or more in height, weighing almost 600 lb. The Murray 'Cod' (*Oligopus macquariensis*) is the most important food-fish in the rivers of S.E. Australia.

BASSES-ALPS (44° 10' N.; 6° E.), department, S.E. France; very mountainous; wool; area, 2,698 sq. miles. Pop. 107,200.

BASSES - PYRÉNÉES, dep.; S.W. France (43° 15' N.; 1° W.). Pyrenees occupy southern portion, elevation increasing W. to E.; many passes; extensive forests covering slopes furnish most valuable product; N. and E. territory consists of pastures and fertile valleys; mineral springs; sheep, cattle; Pau and Biarritz are health resorts. Area, 2,977 sq. m.; pop. 433,300.

BASSE TERRE (16° 3' N.; 61° 42' W.), town, Guadeloupe, W. Indies. Pop. 8,700.

BASSETERRE (17° 20' N.; 62° 44' W.), town, St. Kitts, W. Indies. Pop. 10,000.

BASSET, Venetian card game, introduced into France during the latter part of the XVII. cent., where it became very popular. It was played by five persons with a full pack of cards.

BASSETT, JOHN SPENCER (1867), an American educator. Graduated from

Trinity College, North Carolina; 1888, and from Johns Hopkins in 1894. Became professor of history in Trinity College, N.C., in 1893 and served to 1906. Since that date professor of history in Smith College, Northampton, Mass. Author of *Constitutional Beginnings of North Carolina*; *Slavery in the State of North Carolina*; *The Federalist System* (1905); *Life of Andrew Jackson* (1911); *A Short History of the United States* (1913); *The Plain Story of American History* (1915); *Our War with Germany* (1919); Editor *Correspondence of George Bancroft and Jared Sparks* (1917); *The Westover Journal of John A. Selden* (1921).

BASSI, UGO (1800-49), Ital. revolutionist; became monk; joined national forces, 1848, as chaplain, in which capacity he played important part in Garibaldi movement.

BASSIGNY, district of ancient France, divided (1790) into departments of Meuse, Aube, and Upper Marne.

BASSOMPIERRE, FRANÇOIS DE (1579-1646), Fr. soldier and diplomatist; put down Huguenot rising of 1621-22, and became Maréchal de France. His *Memoires* are important as a hist. source.

BASSOON, large dual-tubed wind instrument, of double-reed kind, serving as bass to oboe and clarinet; evolved from earlier and clumsier instrument, called 'bass-pommer,' which dates back to the XV. cent.; much favored by Bach, Beethoven, Weber, Mozart, and other masters.

BASSORA, BASRA, BUSRA (32° N.; 47° 34' E.), vilayet, Asiatic Turkey; capital and river port, Basra, on Shat-el-Arab, near Persian Gulf; marshy, unhealthy; famous date groves; silk, cotton; area, 53,580 sq. miles. Pop. c. 600,000.

BASS ROCK, THE (56° 4' N.; 2° 38' W.), islet, entrance of Firth of Forth, Scotland; 350 ft. high; circumference, one mile; served as prison for Covenanters; held by Jacobites against William III., 1691-94; frequented by solan geese; lighthouse.

BASS STRAIT (39° 20' S.; 146° E.); channel between Australia and Tasmania, 80 to 150 miles wide.

BASSUS, AUFIDIUS, Rom. historian and orator under Augustus and Tiberius.

BASSWOOD, the Amer. lime, *Tilia americana*; widely distributed over N. America; used for cheap furniture, paper pulp and pianofortes.

BASTAR (19° N.; 81° 30' E.); native

BASTARD

state, Brit. India; high flat plateau; some mountains; dense forests; jungles inhabited by aboriginal tribe; chief town, Jagdialpur; unhealthy; rice, oil-seeds; area, 13,002 sq. miles. Pop. 433,300.

BASTARD (O. Fr.), meaning 'pack-saddle child,' a child born out of wedlock. Such children are not legally entitled to bear the name of either parent, they cannot inherit real property, and, as they are in nearly every legal aspect *filius nullius* ('nobody's child'), the parents can have no control over their marriage. In Eng. law an Act of Parliament is required to legitimize such a child; in Scots law the subsequent marriage of the parents confers this privilege.

BASTI (26° 45' N., 82° 45' E.), town in district of B., United Provinces, India. Pop. 15,000.

BASTIA (42° 40' N., 9° 27' E.), seaport town, N.E. Corsica; former capital; oil. Pop. 29,400.

BASTIAT, FRÉDÉRIC (1801-50), Fr. political economist; started Fr. agitation against Protection (1844); organized Free Trade Association (1846); wrote against Socialism, setting forth virtues of competition (1848-50).

BASTIDE (O. Fr.), name of towns built XII-XIV. cent's in southern France to guard surrounding regions.

BASTIEN-LEPAGE, JULES (1848-84), Fr. artist; painted portraits, landscapes, and hist. pictures: *Sarah Bernhardt, Joan of Arc listening to the Voices, Gambetta on his Death-bed, The Thames at London*.

BASTILLE (O. Fr. *bastir*, to build), name of Fr. castle; especially given to towers guarding city gates of Paris, and now only applied to that of St. Antoine, which in XVII. and XVIII. cent's was used to detain political prisoners. Associated with despotism, it was stormed by the populace, July 14, 1789, and destroyed with every accompaniment of violence and bloodshed; date since observed as *Fête Nationale*; its deep underground dungeons have given rise to many stories of wretched captivities.

BASTINADO (Span. *baston*, a stick), European name for an Eastern form of punishment, consisting of light blows with a stick on the soles of the feet, or other parts of person; if long continued may cause death.

BASTION (Fr.); projection from fortification.

BASUTOLAND, Brit. crown colony, S. Africa (29° S., 28° E.); bounded by Orange Free State on N. and W., Cape

BATAVIA

Prov. on S., Natal on E. and N.E.; surface is part of great plateau, c. 5,000 ft. above sea-level, and has mountains crossing it, including Maluti ranges and Drakensberg; principal rivers, Orange, Caledon; healthy climate. Administration is carried out by resident commissioner subject to authority of high commissioner for S. Africa. Brit. protectorate (1868); became part of Cape Colony (1871); war which occurred (1880-1) in consequence of attempt to disarm natives, resulted in establishment of autonomy; again taken directly under authority of imperial government (1884), since when trade and agriculture have greatly developed; loyal during Boer War. (1899-1902) and the World War. Inhabitants are of Bantu stock, majority Basutos proper, with admixture of other tribes. Basutoland is a native reserve. Cap. is Maseru. Productions include great quantities of cereals, wool, and mohair; cattle, ponies, and sheep raised for export; coal is found. Area, 11,716 sq. m.; pop. 405,900 (including 1,400 whites). See MAP AFRICA.

BAT. See CHIROPTERA.

BATAAN, OR RINCONADA, prov.; Luzon, Philippines (14° 40' N., 120° 30' E.); rice, sugar, etc. Area, 436 sq. m.; pop. 46,800.

BATAC (16° 55' N., 120° 25' E.), town, Luzon, Philippine Islands; sugar. Pop. 23,500.

BATAILLE, HENRY (1872), Fr. lyric poet and playwright. His main theme is the dawn and death of the passion of love. Frequently explains his views of life and art in his prefaces. His strongest work is *La Femme Nus* (1906), story of an artist's model.

BATALA (31° 49' N., 75° 14' E.), town, Punjab, India; cotton, silk. Pop. 27,400.

BATALHA (39° 40' N., 8° 50' W.), town, district Leiria, Portugal; Dominican monastery, commemorates victory of King John I. of Portugal over king of Castile, 1385. Pop. 3,900.

BATANGAS (13° 32' N., 121° 12' E.); seaport, Luzon, Philippine Islands; coffee. Pop. 33,100.

BATAVIA.—(1) Prov., Java, includes some adjacent islands. Area, 2,598 sq. m.; pop. 1,500,000. (2) Seaport, N. coast Java (6° 10' S., 106° 50' E.); cap. and chief commercial city, Dutch E. Indies; the bay, shallow towards coast, served as port before Tanjung Priok harbor, 6 m. N.E., was made; mixed population; unhealthy climate; founded 1610; held by British, 1811-14;

coffee, rice and sugar. Pop. c. 138,500. See MAP EAST INDIA ISLANDS.

BATAVIA, a village of New York, the county seat of Genesee co. It is on the Tonawanda Creek and several railroads, about 35 miles east of Buffalo. Surrounding it is an important agricultural region. Its industries include the manufacture of ploughs, harvesters, carriage wheels, shoes, etc. It has the State Institute for the Blind and the Dean Richmond Memorial Library. Pop. 1920, 13,541.

BATEMANS, THE, a famous theatrical family. Hezekiah Linthicum Bateman (1812-75) took Lyceum Theatre (1871) and introduced Henry Irving to London in *The Bells*. On his death his wife, Sidney Frances (1823-81), continued occupancy of the Lyceum till 1878, when she rebuilt and opened the Sadler's Wells Theatre, and was the first to bring over to England a complete Amer. company with an Amer. play, *The Danites*. Two daughters, Kate (1842-1917), and Ellen (1845), achieved success on the stage. Virginia (1856), a younger sister, married Edward Compton, of the Compton Comedy Company.

BATES, ARLO (1850-1918), an American educator and writer. Graduated at Bowdoin 1876. Litt.D. in 1894. Editor Boston Sunday Courier, 1880-1893. Professor English literature Massachusetts Institute of Technology, 1893-1915. Author: *The Wheel of Fire*; *The Phillistines*, 1889; *Talks in Writing English*, 1897; *Talks on the Study of Literature*, 1898; *The Puritans*, 1899; *Under the Beech Tree*, 1899 *Love in a Cloud*, 1900; *Diary of a Saint*, 1902; *The Intoxicated Ghost*, 1908.

BATES, BLANCHE (1873), an American actress. Educated in San Francisco, Calif. schools where her parents then resided. Made her first appearance on the stage in 1894 at Stockwell's Theatre. In 1895 starred as Mrs. Hillary in *The Senator*. Played leading parts in comedies during 1896-98. She went to Daly's Company in 1898. Later she starred in such successes as *The Great Ruby*; *The Musketeers*; *Madame Butterfly*. She created the title role of *Cigaretta in Under Two Flags*; *Princess Yo-San in The Darling of the Gods*, and the *Girl in the Girl of the Golden West*. She married Milton F. Davis, Lieutenant in U.S.A., and second, in 1912, George Creel.

BATES, HARRY (1850-99) Eng. sculptor; pupil of Rodin; executed many busts and statues on classical subjects; A.R.A. (1892); some of his works, purchased by the Chantrey Trustees, are now in the Tate Gallery.

BATES, HENRY WALTER (1825-92), Eng. naturalist; explored the Amazon with A. R. Wallace; author of *The Naturalist on the Amazons* (1863); assist. sec. of the Roy. Geog. Soc., and eminent entomologist.

BATES, JOHN COALTER (1842-1919), an American soldier, s. of Edward and Julia Davenport Bates. Educated Washington University, St. Louis, Mo. Appointed 1st lieutenant, 11th U.S. Infantry, May 14, 1861; captain, May 1, 1863; major, 5th Infantry, May 6, 1882; lieutenant-col., 13th Infantry, Oct. 19, 1886; colonel, 2nd Infantry, April 25, 1892; brig.-general, U.S.A., May 4, 1898; maj.-gen. U.S.V., Jan. 2, 1900; brig.-gen. U.S.A., Feb. 2, 1901; maj.-gen. July 15, 1902; lieutenant-gen. and Chief of Staff of the Army, Feb. 1, 1906. Retired April 14, 1906. Served in Civil War two years with regiment and two years as aide-de-camp to commanding general, Army of the Potomac. Commanded 3rd Division, 5th Army Corps in Spanish-American War.

BATES, KATHARINE LEE (1859), an American educator, daughter of Rev. William and Cornelia Bates. Graduated at Wellesley College in 1880, A.M. in 1891. Given Litt.D. by Middlebury College in 1914, and Oberlin College in 1916. Taught at Dana Hall, 1881-1885. Went to Wellesley in 1885 as instructor in English, associate professor in 1888 and professor since 1891. Author: *Sunshine and Other Verses for Children*, 1890; *American Literature*, 1898; *Spanish Highways and By-ways*, 1900; *America the Beautiful and Other Poems*, 1911; *The Retinue and Other Poems*, 1918; *Yellow Cover*, 1922. Editor of Coleridge *Ancient Mariner*, 1899; Shakespeare's plays and poems; Keats' *Eve of St. Agnes and Other Poems*, 1902; many of Tennyson's poems and other collections of verse. Translator (with Cornelia Frances Bates) Becquer's *Romantic Legends of Spain*, 1909.

BATES, LINDON WALLACE (1858), an American civil engineer. Educated Chicago High Schools and at Yale. Began as assistant civil engineer N. P. and Oregon Pacific R. R. Contracting engineer and manager various railroads on Pacific coast, as well as in Kansas, Illinois, Missouri and Louisiana. Retained by Belgium 1896-1902 to prepare reports for improvement of harbor of Antwerp; by Great Britain for enlargement of Suez Canal, and by Russian Government for improvements in rivers Volga, Dneiper, and Bug, Azov seaports and channels. Designed eight harbors for Australian government. Contracting engineers Galveston grading raising

works. Designed the 'Three Lake' Panama Canal. Has also directed important work in Trinidad, Peru and Korea. Married Josephine White.

BATES, WILLIAM (1625-99), Eng. Nonconformist preacher and author; chaplain to Charles II.; pub. *The Existence of God and the Immortality of the Soul* (1676), *Spiritual Perfection* (1699), etc.

BATES COLLEGE, in Lewiston, Me., a co-educational institution, opened in 1863. In 1921-2 it had a yearly income of \$186,148, its endowment being \$1,212,841. Its faculty was then 40 and its student body about 500. It has fine chemical and biological laboratories, and a library of 50,000 volumes. Bates was the first eastern college to open its doors to women students, its first woman graduate taking her degree in 1869 and becoming a teacher at Vassar College.

BATH, a city of Maine, the county seat of Sagadahock co. It is on the Kennebec River and the Maine Central railroad, 35 miles south of Augusta, and 12 miles from the Atlantic Ocean. It has regular steamboat connection with Boston and with Augusta. Bath was long noted as the most important ship-building city of the country, but with the decline of the building of wooden ships this industry gradually ceased in importance, although it still remains a leading industry. During the World War many ships were constructed at the Bath shipyards. Its other industries include the manufacture of brass and iron goods, shoes and lumber. There is a public library and other public buildings. Pop. 1920, 14,731.

BATH.—(1) (51° 23' N., 2° 22' W.) watering-place and largest town, Somerset, England; on Avon; the Roman *Aquae Solis*; its hot saline and chalybeate springs were known to Romans from 1. cent.; contains Rom. baths and other antiquities; Abbey Church, begun in Henry VII.'s reign, completed 1609; Bath and Wells have formed one bishopric since 1135; very fashionable in XVIII. cent. Pop. 69,200.

BATH, ORDER OF THE, order of chivalry of U.K., founded 1390, re-founded 1725 and 1815, and frequently extended since. Originally a purely military order, it received in 1815, a civil element; was remodeled in 1847, and since then several times enlarged; the civil and military badges, which are slightly different, alike bear motto, *Tria juncta in uno*, about rose, sham-rock, and thistle, Ceremony of installation restored by the King (1913); first held, May 1920.

BATH, THOMAS THYNNE, 1ST MARQUESS OF (1734-96), Eng. politician; e. s. of Viscount Weymouth; libelled by Wilkes, who was therefore expelled from Parliament.

BATH, WILLIAM PULTENEY, 1ST EARL OF (1684-1764), Brit. statesman; took prominent part against Dr. Sacheverell; led opposition to Walpole, and on his fall, 1741, became Prime Minister; lost influence on accepting peerage (1742); gift of attack, but not administration; good scholar and orator.

BATHGATE (55° 53' N., 3° 40' W.), town, Linlithgowshire, Scotland; minerals, paraffin. Pop. 8,200.

BATHILDA, ST. (d. 680); Eng. princess; m. Clovis II. of France; regent during minority of Clothair III., Childeric II., and Thierry III.

BATHOLITE, igneous (granite) rock intruded in stratified rocks, and forming bosses.

BATHONIAN SERIES, oolitic limestone strata, first studied near Bath; corresponds to Upper Dogger (Middle Jurassic) of Germany.

BATHORI, ELIZABETH (d. 1614); Polish princess, said to have been a werewolf; imprisoned 1610 on charge of numberless horrible murders.

BATHORY, SIGISMUND (1572-1613), Prince of Transylvania; disastrous anti-Turkey policy.

BATHOS, a descent from the elevated to the ridiculous (or commonplace).

BATHS. The habit of bathing, both for cleanliness and for pleasure, has been practiced by almost every people from the earliest times. Before the inception of public and private b's it was customary to bathe in running waters of river, but hot b's were employed by the early Egyptians, Greeks, and Persians, and are referred to in Homer as restorative after violent exertions. The buildings themselves must in primitive times have had considered pretensions to luxury, for the b. of the Persian king, Darius, excited wonder and admiration of Alexander the Great. It was, however, under Rom. empire that public b's reached most advanced stage of luxury. The earliest Roman b's were called *piscinae*, and were cold swimming-baths, but later developed into vast establishments called *thermae*, which included cold swimming b's for both sexes, hot b's, vapor b's, dressing rooms, a gymnasium, and sometimes also a library and theatre. Such *thermae* were erected by the Emperors Agrippa, Nero, Titus, Domitian, and several later rulers. The

b's appear to have reached their highest state of luxury under Diocletian. Marble seats were provided for thousands of bathers; water flowed from mouths of silver lions into basins of the same precious metal, and while young men played at ball in the spacious gymnasium, philosophers and elder folks discussed the news of the day in the marble galleries adorned with mosaics and enriched with sculptures. Soap being then unknown, the Romans had their bodies anointed by the b. attendants with oils and pomades, after which the skin was scraped with a curved metal instrument, called the *strigillus*; usual bathing hour was before dinner, but it was not uncommon to take several b's during course of day. In addition to hot-water and hot-air b's, sun b's were commonly indulged in by the Greeks and Romans, and the habit of burying the body in sand dates back to even earlier times. There are various modern specialized forms of bathing—Turkish, Russian, electric, mineral, etc.

BATHSEBA, BATHSHEBA.—(1) Bible character; wife of Uriah the Hittite, slain for her sake by David, who then took her to wife. (2) Duchess of Portsmouth in Dryden's *Absalom and Achitophel*.

BATHSTONE, mixed limestone and sandstone (Lower Oolite stratum) obtained from neighborhood of Bath; used for scouring and for covering hearths, etc.

BATHYBUS, slimy precipitate of gypsum by alcohol in sea-water, at one time supposed to be a simple living organism living in the deep sea.

BATHURST.—(1) (33° 27' S., 149° 35' E.) town New South Wales. Pop. 8,600. (2) (43° 19' S., 146° E.) town, Tasmania. (3) (13° 24' N., 16° 36' W.) town, Gambia, W. Africa. Pop. 12,000.

BATISTE, fine, closely woven linen, said to be named from inventor, Baptiste of Cambrai, XVIII. cent.

BATLEY (53° 43' N., 1° 38' W.), town, Yorkshire, England. Pop. 35,000.

BATON (Fr. *baton*), staff carried by a field-marshal; a policeman's truncheon; light stick used by orchestra conductor; sign of illegitimacy in heraldry ('baton sinister'), often erroneously called 'the bar sinister.'

BATON ROUGE, a city of Louisiana, the capital of the State and the county seat of East Baton Rouge Parish. It is on the Mississippi River and on several important railroads; about 90 miles northwest of New Orleans. The city is built on a bluff on the east bank of the

river and is interesting because of the mixture of French and Spanish architectural types of buildings. Among the important public buildings are the Capitol, the State University, the State Agricultural and Mechanical College, and the State Asylum for the Deaf, Dumb and Blind. Other public institutions include orphans' homes and insane asylums. In Baton Rouge, on January 26, 1861, the State Convention adopted the Ordinance of Secession. The city was captured by Union forces on May 7, 1862, and was held until the close of the war. It has been the capital of the State since 1882. Pop. 1920, 21,782.

BATRACHIA, class of vertebrates of interest as illustrating the transition from aquatic to terrestrial life; frequently considered conterminous with *amphibia*, or as a sub-class of the latter. Through the Dipnoi they are to a certain extent linked with fishes, and through Microsauria (*Stegocephalla*) with reptiles. The main anatomical differences separating Batrachians from reptiles, although no satisfactory line of demarcation can be drawn, are the skull bones. Excepting a few viviparous forms, they mostly undergo a gill-breathing stage in their metamorphosis.

BATRACHOMYOMACHIA (Gk. 'battle of the frogs and mice'), mock-epic, in hexameter verse, of unknown authorship, sometimes ascribed to Homer

BATTA, Anglo-Indian designation of rations served to soldiery in war.

BATTAGLIA (45° 15' N., 11° 50' E.), town, Venetia, Italy; warm saline springs.

BATTALION, military division consisting of four or more companies.

BATTENBERG, revived Ger. title conferred upon Countess von Hauke, morganic wife of Prince Alexander von Hesse; made Countess of B. (1851), raised to rank of Princess, 1858; *e. s.*, Louis, became admiral in Eng. navy; 3rd *s.*, Henry Maurice, m. Princess Beatrice, Queen Victoria's dau. (1885), and *d.* 1896; the dau. of the latter, Victoria Eugénie, m. (1906) Alfonso XIII. of Spain. B. lies in Hesse-Nassau, Prussia. English title changed to Mountbatten, in 1914.

BATTERING-RAM, primitive military weapon, dating back to times of Josephus, or earlier, used for beating down the walls of a fortress; it was a heavy beam, about 120 ft. long, shod at the fore end with a piece of metal, shaped like a ram's head, and generally slung in a wooden protected framework.

BATTERSEA, metropolitan borough, S.W. London; Surry side. Thames, opposite Chelsea, and communicating by bridges; fine park; factories and foundries.

BATTERY, ELECTRIC PRIMARY, an arrangement of cells, elements, or couples which produces a current of electricity by chemical action. The original voltaic cell consisted of a zinc and a copper plate joined by a wire and immersed in a weak acid solution. The hydrogen liberated made a coating on the copper (negative) plate, stimulated reverse action and thus weakened the current (*polarization*). This was obviated in the Daniell's cell by placing the copper in a solution of copper sulphate in a porous pot, the hydrogen then replacing the copper which was deposited on the copper plate. In the Grove cell platinum foil is immersed in concentrated nitric acid, instead of copper in copper sulphate. The Bunsen cell is a modification of the Grove cell, the expensive platinum plate being replaced by a rod of carbon. In the Leclanché cell zinc rests in sal-ammoniac solution, and a plate of carbon (replacing copper) is placed in a porous pot packed with manganese dioxide and bits of carbon. This is the cell generally used for electric bells, etc.

BATTHYANI, family of Hungarian nobles who claim descent from Ors, companion of Arpad; chief members, Prince Karl Joseph (1697-1772), Austrian field-marshal, distinguished in War of Austrian Succession; Count Casimir (1807-54), follower of Kossuth and Hungarian foreign minister; Count Louis (1806-49), premier of first responsible ministry, 1848, but resigned; executed by order of court-martial.

BATTIK, a method of designing on textiles native to the Dutch East Indies. The piece of cloth to be treated, which may be linen, silk, velvet, or even leather, is stretched out on a flat surface and certain designs are traced over it. The surface included in the designs is then covered carefully with a gluey substance which becomes stiff on drying. After that the background is dyed in suitable colors, with indelible dyes. After drying the fabric is washed in water of boiling temperature, which takes out all of the stiffening, leaving the design as a white silhouette against the colored background. Battik is now manufactured in Holland, on a commercial scale, for home use and export.

BATTLE, a hostile encounter between two or more armies on land or navies at sea. The real import of a battle depends not on the numbers engaged or the casualties, but on the degree in which it realizes the general objective of one side

or the other. The chief distinction in modern war is between battles in the open and battles on elaborately entrenched fronts. Among the greatest land battles in history are the following, Marathon (490 B.C.), Syracuse, (413); Arbela (331), Metaurus (207), Philippi (42), victory of Arminius over Varus (A.D. 9), Chalons (451), Tours (732), Hastings (1066), Blenheim (1704), Pult-Hastings (1066), Orleans (1429), Lützen (1032), Blenheim (1704), Pultowa (1709), Saratoga (1777), Vainy (1792), Waterloo (1815), Königgrätz or Sadowa (1866), Sedan (1870), Gettysburg (1863). These include the battles which, according to Sir Edward Creasy (*The Fifteen Decisive Battles of the World*), 'claim our attention, independently of the moral worth of the combatants, on account of their enduring importance.' To the number may now be added Marne (Sept. 1914 and July 1918), Ypres (Oct.-Nov. 1914 and April-May 1915), Verdun (Feb.-July 1916), Amiens (Aug. 8, 1918), Cambrai-St. Quentin (Sept.-Oct. 1918), Armageddon (Sept.-Oct. 1918). Of naval engagements the following are among the most important: Salamis (480 B.C.), Actium (31 B.C.), Lepanto (1571), Spanish Armada (1588), Gibraltar (1607), Eng. victory over the Dutch (1666), St. Vincent (1693), Carthegena (1702), Finisterre (1747), Gibraltar (1782), Ushant (1794), St. Vincent (1797), Camperdown (1797), Trafalgar (1805), Navarino (1827), Acre (1840), Alexandria (1882), Wei-hai-wei (1895), Santiago (Cuba, 1898) Tsushima (1905), Falkland Islands (1914), and Jutland (1916).

BATTLE (50° 55' N., 0° 30' E.); town, Sussex, England; received its present name (in place of *Senlac*) from the battle in which William I. defeated Harold (1066). The conqueror founded there a Benedictine abbey in which was deposited Battle Abbey Roll, supposed list of barons who fought with William; authenticity of the copies is disputed.

BATTLE CREEK, a city of Michigan, in Calhoun co. It is on the junction of Kalamazoo and Battle Creek rivers, and is on several important railroads. It is the center of an agricultural and stock raising region. Its excellent climate makes it a favorite summer resort, and it has the largest sanitarium in the world. There are many lakes and rivers in the neighborhood. Battle Creek is an important manufacturing city. Among its chief industries is the making of cereal foods, steam pumps, printing presses, and agricultural machinery. It has the division offices of the Grand Trunk Railroad. Pop. 1920, 36,164; est. 1923, 40,092.

BATTLEDORE (derivation unknown). (1) Plaything like small tennis-racket used in game of b. and shuttlecock; (2) (Obs.) hornbook; (3) implement used to beat clothes in washing; (4) applied to certain tools, etc.

BATTLEFORD (52° 40' N., 108° 20' W.), town, Saskatchewan, Canada.

BATTLEMENT, parapet surmounting walls of a fortified building, consisting of solid blocks of masonry

BATU, ROCK ISLANDS (0° 10' S., 98° E.), group of small islands, Dutch East Indies; cocoanuts.

BATUM, a city of the former Russian province of Trans-Caucasia, now a part of the Soviet Republic of Armenia. The city is on the eastern coast of the Black Sea, and is the center of one of the most important petroleum fields in Asia. Before the World War Batum was one of the chief exporting cities for petroleum and it acquired great importance also for the exports of silk, grain and flour. It was several times captured during the World War by Turkish and Russian troops. The possession of the oil fields in and about Batum was one of the disputed points in the conference at Lausanne, in (1923), between the Great Powers and Turkey. Pop. of the city, about 50,000; of the province, about 170,000.

BATTUE, the system of killing game by means of beating the bushes and driving the quarry towards a given point where the guns wait.

BATYPHONE, musical instrument of the clarinet type, invented (1839); proved ineffective, and gave place to the bass tuba.

BAUAN (13° 50' N., 121° E.), town Luzon, Philippine Islands; palm-fibre goods. Pop. 40,000.

BAUCHI (10° N., 9° 30' E.), province, Brit. Protectorate, N. Nigeria; larger portion, N. W. to S. E., occupied by belt of highlands; plateau forming S. W. of province fertile and grow grain, cotton, indigo; inhabitants mainly pagan tribes; in consequence of persistent slave-raiding by Fula, a Brit. expedition was sent out (1902); Emir overthrown and country brought under Brit. rule.

BAUCIS, wife, according to Ovid, *Metamorphoses*, of Philemon; the couple extended hospitality to Zeus in Phrygia, and in reward their house was changed into a temple while others were destroyed by floods; changed into trees in answer to their request that they might

not be separated; types of conjugal constancy.

BAUDELAIRE, CHARLES PIERRE (1821-67), Fr. poet; after taking degree (1839), led life of extravagant debauchery; acquired habits of opium and hashisch; paralysis was followed by miserable death; first important literary work, translation of tales of horror of Edgar Allen Poe, in which B. found kindred spirit, though his own poems far surpass those of Poe in depth and technique; bond between the two was their love of thrills and their morbidity; B. analyses himself in *Lunatiques*, an essay on those who are under influence of the moon and 'love all that it loves.' First collection of poems appeared (1857) as *Fleurs du mal*, some of which were excised by censors after prosecution of author; further translation from Poe and much critical work followed.

BAUDIER, MICHEL (1589-1645), Fr. historian; historiographer to Louis XIII.

BAUDRILLART, HENRI JOSEPH LEON (1821-92), Fr. economist; author of *Hean Bodin et son temps* (1853); *Manuel d'economie politique* (1857); *Des rapports de la morale et de l'economie politique* (1860).

BAUDRY OF BOURQUEIL (d. 1130); Fr. poet and historian; became abbot of Bourguell abbey (1079); abp. of Dol (1107); most important work, history of first crusade (1095-99) entitled *Historiae Hierosolymitanoe*.

BAUDRY, PAUL JACQUES AIME (1828-86), Fr. artist; excelled in portraits and classical subjects, and became famous for his mural decorations in foyer of Paris opera-house, and other public buildings.

BAUER, CAROLINE (1807-78); Ger. actress of much celebrity; left memoirs, *Aus meinen Buhnenleben*, etc.

BAUER, HAROLD (1873), an English pianist. From his father he was first taught to play the violin and afterwards studied under competent German masters. He made his first public appearance in (1883) at the age of ten. Turning to the piano he studied under Paderewski for one year and in (1893) made a successful tour of Russia and Europe. His first visit to the United States was made in (1900). He proved immensely popular, which paved the way to almost yearly tours thereafter.

BAUER, LOUIS AGRICOLA (1865). Graduated University of Cincinnati (1888); University of Berlin (1895); D.Sc. University of Cincinnati (1913);

Became astronomical and magnetic computer, U. S. Coast Survey (1887). Assistant professor mathematics (1897-99), University of Cincinnati. Chief Terrestrial Magnetism Division, U. S. Coast Survey (1899-1906). Director department Terrestrial Magnetism, Carnegie Institution since (1894). Editor Terrestrial Magnetism and Atmospheric Electricity since (1896). Frequent contributor to scientific press on terrestrial magnetism, physics, etc.

BAUM (LYMAN) FRANK (1858-1919), an American author, educated at Syracuse Academy, New York. Began newspaper work in (1880). Edited *Dakota Pioneer*, Aberdeen, S. D. (1880-90), and the *Show Window*, Chicago (1897-1902). Author *Mother Goose in Prose* (1897-1902), *Father Goose—His Book* (1899), *A New Wonderland* (1900), *The Army Alphabet* (1900), *The Marvelous Land of Oz* (1904), *Animal Fairy Tales* (1905), *Baum's Fairy Tales* (1908), and a number of plays. For over twenty years wrote children's and other stories for *Youth's Companion*, *Harpers*, *St. Nicholas* and other magazines.

BAUMBACH, RUDOLF (1840-1905), Ger. poet; b. Thuringia; made considerable reputation as writer of narrative and legendary verse and vagabond lyrics; pub. *Zlatorog* (1877), *Lieder eins fahrenden Gesellen*.

BAUR, FERDINAND CHRISTIAN (1792-1860), Ger. theologian; prof. of Theol. at Tübingen; wrote numerous works on Church history, Biblical criticism, and the philosophy of religion.

BAUTAIN, LOUIS EUGÈNE MARIE (1796-1867), Fr. philosopher; pub. *Philosophie du Christianisme* (1835); *Philosophie Experimentale* (1839); *Philosophie morale* (1840), and other works of a like character.

BAUTZEN (51° 12' N., 8° 25' E.), capital of district of same name, Saxony; surrounded by old walls with towers; possesses Castle of Ortenburg and Early Gothic *Domkirche*; many industries: textile, machinery, ironworks, etc.; besieged by Hussites, 1431; captured by Saxons, 1620; Wallenstein, 1633; Saxons again, 1634; Napoleon defeated Russians here with great slaughter, 1813. Pop. 32,800.

BAVARIA, or BAYERN (49° N., 12° E.), Socialist republic and member of Republic of German Empire, E. side of S. Germany. Bavaria has detached portion called Palatinate or Rhenish Bavaria, W. of Rhine, N. of Alsace. Surface along boundaries is generally hilly; chief ranges, those of Alps in S. (highest peak, Zugspitze, 9,700 ft.);

Frankenwald, Fichtelgebirge, and Rhongebirge in N.; Böhmerwald in N.E.; Haardt mts. in Palatinate. Palatinate is drained by Rhine and tributaries, S. of Bavaria proper by Danube with tributaries Isar and Inn, N. by Main; Danube and Main connected by Ludwig's Canal; principal lakes, Ammer-See, Starnberger See, Walchen See. Climate varies; lower parts have mean temp. of 50° F., higher, 39°; rainfall is from 25 to over 75 in.

Over half area is cultivated; chief wealth, produce of fertile soil; plains N. of Munich called 'granary of Germany'; chief crops are rye, oats, barley, wheat; hops, sugar-beet, tobacco, vines grown in Franconia, flax in Upper Bavaria and Swabia, vines in Palatinate; one-sixth of surface under grass, cattle and sheep largely raised, dairy farming carried on; one-third of area under timber—oak, beech, pine; chief forest districts are along Alps in S., in Franconia and Palatinate. Chief minerals are salt, coal, lignite, iron graphite, lithographic stone; mineral springs abound. Most important manufacture is beer; other industries are pencil making, Christmas card producing, distilling, manufacture of linens, woollens, glass, porcelain, sugar, toys, chemicals, jewelry, mathematical instruments. Cap. Munich. Area, 30,346 sq. m.; pop. 6,887,300.

History.—Bavaria was apparently inhabited from about 600 B.C. by Celtic people, who were conquered by Rome late in 1st cent. B.C. [After fall of Western Empire country was occupied by tribes called Boiarii, who ultimately became tributary to Franks; ruled for over two centuries by dukes; formed part of Charlemagne's dominions, and after his death was governed first by margraves, and after 920 by dukes; duchy held by Guelph family (1070-1137); granted by emperor to Otto, Count of Wittelsbach (1180), ancestor of recent dynasty. During several centuries various partitions of duchy occurred, but in 1506 country was united under Albert the Wise, who established system of primogeniture; on extinction of younger or Bavarian line of Wittelsbach family with death of Maximilian Joseph in 1777, succession passed to representative of older branch, Charles Theodore, Elector Palatine, whose family had held Palatinate since 1329, when it was separated from Bavaria proper. Bavaria was after this involved in wars, first against Austria and afterwards against France, to whom she lost Palatinate in 1801. She then formed alliance with France, by whose aid she became a kingdom in 1805; subsequently joined alliance against Napoleon (1813); regained Palatinate W. of Rhine (1814-15); new constitution

BAVENO

granted by Maximilian (1818); became integral part of Ger. Empire (1871). Ludwig II. committed suicide in 1886; succeeded by brother, Otto I., on account of whose insanity country was governed by regent. Ludwig III. became king (1913); in Nov. 1918, dynasty was deposed and independent Socialist republic founded; provisional constitution made public (Jan. 1919), chief items being: supreme power lies with people; unicameral Diet; suffrage is universal, equal direct, secret, proportional; no privileges for birth and caste; all religious associations have equal rights and freedom. See MAP GERMANY.

BAVENO (45° 55' N., 8° 15' E.), town, on Lake Maggiore, Italy; summer resort; granite quarries; cotton.

BAXTER, ANDREW (1686-1750), Scot. metaphysician; principal work, *Enquiry into the Nature of the Human Soul* (1733), an examination of the properties of matter.

BAXTER, RICHARD (1615-91), Eng. Puritan preacher; b. Rowton, Salop. During the Civil War he acted as chaplain in the Parliamentary army; strongly opposed to execution of Charles I., and was influential in bringing about the Restoration; became Charles II.'s chaplain. B. subsequently underwent much persecution at the hands of Judge Jeffrys, being imprisoned for eighteen months. He was noted for the saintliness of his private life, and, though he suffered continually from ill-health, his industry was remarkable. He is credited with the authorship of nearly 170 works, of which the best known is his *Saints' Everlasting Rest* (1650); others being *Call to the Unconverted* (1657); *The Life of Faith* (1670), and *Christian Directory* (1675).

BAXTER, SYLVESTER (1850), son Sylvester and Rosella Ford Baxter. Educated at Academies of Leipzig and Berlin, 1875-1877. Joined staff of Boston Advertiser in 1871; with Boston Herald, 1879-1883; and 1887-1905. Editor Outing Magazine, 1885-86. First projected organization of Greater Boston and Boston Met. Park System. Author *Greater Boston* (1891); *Spanish Colonial Architecture in Mexico* (1902); *Old Marblehead* (1906); *The Unseen House* (poems, 1917).

BAY, indentation in a coast-line; chestnut color (see **BAYARD**); peculiar bark of a dog (hence Scott's 'deep-mouthed bloodhound's heavy bay'); the laurel tree (hence to be 'crowned with bays' is to be crowned with laurel leaves); bay-window, window in bay (division of room architecturally severed from rest).

BAYADÈRES, dancing women of

BAY CITY

India of the two ranks—*devadasi*, who perform religious dances in services of the *devas*, and *nautchis*, wonderfully trained secular dancers.

BAYAMO (20° 27' N., 76° 57' W.); town, on river B., E. Cuba; sugar-cane. Pop. 4,100.

BAYARD (O. Fr. 'bay'), orig. bay horse; especially applied to celebrated bay steed of Rinaldo (q.v.).

BAYARD, PIERRE DU TERRAIL, CHEVALIER DE (1473-1524), Fr. military commander; born in Dauphiné; perfect example of chivalrous knight of mediæval type; was renowned for looks, bravery, kindness, piety, and military genius—the *Chevalier sans peur et sans reproche*. After serving as page to the Duke of Saxony, he entered the service of Charles VIII. of France, whom he accompanied into Italy; distinguished himself at battle of Fornovo (1495), when he was knighted; held the bridge of the Garigliano single-handed against 200 Spaniards; took part in the sieges of Genoa, Padua, and Brescia; displayed remarkable bravery at the battle of Ravenna (1512); fell a prisoner to Henry VIII. at the Battle of Spurs (1513), but was immediately set at liberty; conferred knighthood on Francis I., at latter's request, after the victory of Marignano; mortally wounded in defending passage of the Sesia against the Milanese.

BAYARD, THOMAS FRANCIS (1828-98), Amer. democratic statesman and diplomatist; ambassador to Great Britain in Bering Sea controversy.

BAYARD, THOMAS FRANCIS (1868), United States Senator from Delaware, born in Wilmington, Del. He graduated from Yale University in 1890 and afterwards studied law. After practicing for a short time in New York City he removed to Wilmington. He took an active part in politics and was elected U.S. Senator in November 1922, to fill an unexpired term, and for the full term of six years beginning May 4, 1923. He was a son of Thomas Francis Bayard.

BAYASID, BAJAZET (39° 27' N., 44° 9' E.), fortified town, Armenia, Asiatic Turkey; military station.

BAYBAY (10° 42' N., 124° 55' E.); town, W. coast of Leyte, Philippine Islands; hemp, rice. Pop. 17,000.

BAYBERRY (*Pimenta acris*), tropical Amer. plant of myrtle order; leaves used for bay rum.

BAY CITY, a city of Michigan, the county seat of Bay co. It is on the Saginaw River and on several important

railroads, 13 miles north of Saginaw. The city has important industries including the manufacture of ships and has a large trade in lumber, coal and manufactured materials, cement and sugar. It is also the center of an important bean and sugar beet country. It has several banks and a number of important government buildings including the United States Government Building. Bay City and West City were consolidated in 1905. Pop. 1920, 47,554; 1923, 48,415.

BAYEUX (49° 13' N.; 0° 43' W.), town, capital of Calvados, France; early Gothic cathedral; museum contains celebrated B. tapestry; lace. Pop. 7,800.

BAY ISLANDS (16° 30' N.; 86° 30' W.), group in Caribbean Sea, N. of Honduras, to which they belong; fruit. Pop. 6,020.

BAYLE, PIERRE (1647 - 1706), Fr. author and philosopher; pub. *Pensees diverses sur la Comete de 1680* (1682); *Dictionnaire historique et critique, Nouvelles de la Republique des Lettres*; for some years prof. of Philosophy and History at Rotterdam; attitude towards established beliefs and attempt to modernize knowledge, anticipate work of philosophers and encyclopedists of succeeding cent., who drew much from him.

BAYLOR UNIVERSITY, in Waco, Tex., a Baptist institution, founded in 1845 under a charter from the Republic of Texas. It acquired its university course in 1851. Its buildings are valued at \$800,000 and its library has 40,000 volumes. It includes a preparatory school, Baylor Academy, a normal school and has a department of medicine and pharmacy at Dallas. In 1922 its student body numbered 1600, not including those who attended the summer courses and the students of the normal course, numbering 705. The faculty then numbered 61. The president is Samuel Palmer Brooks.

BAYLY, THOMAS HAYNES (1797-1839), Eng. dramatist and song-writer, (e.g.) *She Wore a Wreath of Roses*; *I'd be a Butterfly*.

BAYNES, THOMAS SPENCER (1823-87), Eng. philosopher and man of letters; ed. Bath and Edinburgh Univ.; edited *Edinburgh Guardian* (1850-52); assistant-editor of *Daily News* (1858); prof. of Logic at St. Andrews (1864); app. editor of *Encyclopaedia Britannica*, 9th edition (1873), with which he was associated until his death.

BAYONET, short sword fixed to muzzle of rifle; introduced into Fr. army by Louvois under Louis XIV.; takes name from Bayonne (q.v.).

BAYONNE (43° 27' N.; 1° 33' W.), fortified town, Basses-Pyrénées, France, on Adour; in possession of English, 1152-1451; XII-cent. cathedral; gave name to *bayonet*; chocolate, leather; large trade. Pop. 28,000.

BAYONNE, a city of New Jersey, in Hudson co. It is on Newark Bay, New York Harbor, the Kill von Kull and Central of New Jersey and Lehigh Valley railroads. It is about 7 miles southwest of New York. Bayonne includes a number of former villages. Its industries include petroleum refineries, which are connected by pipe lines with New York, Philadelphia and other large cities. Its other industries include the manufacture of radiators, motors, silks, copper products, etc. The city is connected with Jersey City, Newark and other surrounding communities by trolley. Pop. 1920, 76,754; est. 1924, 86,548.

BAYREUTH, BAIREUTH (49° 55' N.; 11° 32' E.), town, Upper Franconia, Bavaria; former residence of margraves; noted musical festivals; national theatre erected by Ludwig II. for performance of Wagner's operas; houses of Wagner and Richter; Liszt's burial place; woolen, linen, and cotton goods. Pop. 34,500.

BAY RUM, rum distilled with bayberry leaves; used extensively by hairdressers.

BAZA (37° 33' N.; 2° 43' W.), ancient town, Granada, Spain.

BAZAAR, Persian word for market, a line of stalls or booths; in England it has been adopted as general name for sale-of-work for charitable or other purposes, and for retail establishments in which objects of varied character are sold at same price.

BAZAINE, FRANCOIS ACHILLE (1811-88), Fr. soldier; rose from ranks; made general in Crimean War; commander of Legion of Honor (1855); marshal and senator of France (1864); chief commander in Franco - German War; charged with treason for Fr. defeat, and sentenced to 20 years' detention for capitulating at Metz before necessity demanded.

BAZANCOURT, vil.; dep. Marne, France (49° 23' N., 4° 11' E.); occupied by Germans but restored to France Oct. 1918.

BAZARD, AMAND (1791-1832), Fr. Socialist; wrote *Exposition de la doctrine de Saint-Simon* and founded the *Charbonnerie française*, branch of Carbonari (q.v.).

BAZAS (44° 27' N., 0° 12' W.), town, Gironde, S.W. France; tanneries. Pop. c.5,000.

BAZIGARS, nomadic people of India; Muhammadans.

BAZIN, FRANÇOIS (1816-78), Fr. musical composer; among his comic operas is *Le Maître Pathelin*.

BAZIN, RENÉ FRANÇOIS NICOLAS, MARIE (1853), Fr. Academician. Educated at Angers, France. Doctor of Laws of University of France. Contributed to the *Revue de Deux Mondes*, to the *Correspondant*, and to the *Journal de Debatis*. Elected to French Academy, 1903. Author: *Ma Tante Giron*; *La Sarcelle bleue*; *Sicile*; *Contes de bourse Perrette*; *Le Ble qui leve*; *Le Mariage de Mlle. Girel*; *La Douce France*; *Les Nouveaux Oberle*; *Charles de Foucauld*. Has traveled much through Europe, England, Egypt, Morocco and North Africa.

B.C., before Christ; British Columbia.

BEACH, ALFRED ELY (1826-1896), an American editor and inventor, son of Moses Yale Beach, editor of New York Sun. With Orson D. Munn he founded the weekly *Scientific American* in 1846 and was for nearly fifty years its editor as well as manager of its patent interests. He perfected a typewriting machine in 1852. Among other devices that he either invented or perfected for patent may be cited underground pneumatic tubes, a pneumatic elevated railroad and a hydraulic shield for tunnel excavations.

BEACH, DAVID NELSON (1848), son of Joseph W. and Mary Angeline Beach, son of Harlan Page Beach. An American theologian. Graduated at Yale in 1872 and from the Yale Divinity School in 1876. Given degree of D.D. by Western Reserve College in 1896. Ordained in Congregational Ministry, 1876. Pastor at Westerly, R.I.; Wakefield, Mass.; Cambridge, Mass.; Minneapolis, Minn., and Denver, Colo. President and professor homiletics Bangor Theological Seminary since 1903. Author, *The Newer Religious Thinking*, (1893); *Statement of Belief*, (1897); and a *Handbook of Homiletics*, (1917).

BEACH, HARLAN PAGE (1854), son of Joseph W. and Mary Angeline Beach, brother of David Nelson Beach. Graduated at Yale in 1878 and from the Andover Theological Seminary in 1883. Missionary to China, 1883-1890. Educational Secretary Student Volunteer Movement for Foreign Missions, 1895-1906. Since 1906 professor of theory and practice of missions at Yale University.

Author, *Geography and Atlas of Protestant Missions*, (2 vol., 1903); *World Statistics of Christian Missions* (co-author) 1916.

BEACH, REX (ELLINGWOOD) (1877), an American author. Educated at Rollins College, Winter Park, Florida and at Chicago College of Law and Kent College of Law, Chicago, Ill. Author, *The Spoilers* (1908); *The Barrier* (1907); *Going Some* (1901); *The Net* (1912); *The Ne'er-do-Well* (1911); *The Iron Trail* (1913); *Rainbow's End* (1916) and *The Crimson Gardenia*. Also author of a number of plays, the most prominent ones being *Going Some* (with Paul Armstrong); *The Spoilers* (with James McArthur). Has contributed a number of short stories to the popular magazines.

BEACHES, RAISED, ancient sea margins presenting horizontal terraces at varying heights above present sea-level, caused by gradual elevation of land.

BEACHY HEAD (50° 44' N., 0° 15' E.), headland, S. coast of Sussex, Eng.; perpendicular chalk cliff, projecting into Eng. Channel, 570 ft. high; French gained naval victory over combined Eng. and Dutch fleets, 1690; Belle lighthouse erected, 1831.

BEACON, a city of New York, formed in 1913 by the consolidation of Fishkill Landing and Matteawan. It is in Dutchess co. Its manufacturing industries include hats, tools, machinery, etc. The city has a hospital, a public library and several educational institutions. Beacon was the first of the cities of the State to adopt the commission form of government. Pop. 1920, 10,996.

BEACONSFIELD.—(1) (51° 35' N., 0° 42' W.), market town and parish, Buckinghamshire, England; burial-place of Edmund Burke. (2) (28° 55' S., 24° 45' E.), town, adjoining Kimberley, S. Africa; diamonds. Pop. 1919, 14,295. (3) (41° 10' S., 146° 46' E.), town, Tasmania, center of goldfields. Pop. c. 3,000.

BEACONSFIELD, BENJAMIN DISRAELI, EARL OF (1804-81), Eng. statesman and novelist; b. London; s. of Isaac Disraeli (author of *Curiosities of Literature*, etc.). The f. with all his family abandoned Judaism, and Benjamin was baptized in the Eng. Church (1817). He received little schooling, but had the run of his f.'s extensive library; in solicitor's office, Old Jewry, 1821-23; entered at Lincoln's Inn (1824), but, having made acquaintance of John Murray, turned attention to literature; achieved considerable success with his

novel *Visian Grey* (1826); became society dandy; health breaking down, he traveled abroad for some years, reappearing as Radical candidate for High Wycombe (1832); attacked Liberals in *Letters of Runnymede* (1836); returned as Conservative member for Maldstone (1837); delivered maiden speech in House, a disastrous failure, but memorable for his prediction, 'The time will come when you will hear me'; at first a follower of Peel, but went over to the Protectionists; became Chancellor of the Exchequer under Lord Derby (1852), again (1858-59 and 1866); Prime Minister for a short time (1868), and again took office (1874-80). He was undoubtedly one of the greatest statesmen of modern times. In 1876 he was created Earl of Beaconsfield by Queen Victoria in recognition of his great achievements in advancing the power of the empire.

BEADLE, parish officer, app. by the vestry, who received wages out of the church rate. Until the transference of poor-law business to the Guardians, in 1834, he was an officer of some importance. The word survives in the 'bedels' of Oxford and the 'Eaquire-bedels' of Cambridge, who are honorary attendants upon the Vice-Chancellor.

BEADS, glass b's are made from rough glass tubing which is cut into small sections and heated in moving drums with charcoal, etc. They have been used as ornaments from earliest times, specimens being found in Assyrian temples, on Egyptian mummies, and in the graves of Romans, Greeks, and Britons.

BEAGLING, old Eng. sport. The *beagle* resembles a foxhound, but is much smaller (smallness being one of its points) with very short legs and not anything like the speed of the foxhound; the pack is therefore followed on foot, often with the addition of hunting poles for clearing obstacles, and used only for chasing hares and rabbits. Beagles have deep bell-like bay to which they probably owe their name, and are extremely intelligent and faithful; now to great extent superseded by harriers.

BEAK, bill of a bird or anything of similar shape, as jaws of Cuttlefish, avicularium of Polyzoa, umbo of Lamellibranch shells, spout of Weevils, and prow of a ship.

BEALE, DOROTHEA (1831-1906), Eng. educationist; b. London; ed. Queen's Coll.; principal of Cheltenham Ladies' College, 1858, till death; raised college to foremost rank and exercised a remarkable influence over her pupils.

BEALE, TRUXTON (1856), an Amer. diplomat, son of Edward F. and Mary

E. Beale. Graduate Pennsylvania Military College at Chester, in 1874; LL.B. degree from Columbia, in 1878. Managed father's ranch in Kern co., Cal., 1878 to 1891. Appointed Minister to Persia in 1891; to Greece, Roumania and Servia in 1893. Traveled Siberia and Central Asia, 1894 to 1896. Contributed to magazines on questions of international interest.

BEAM, one of stout transverse timber props which support ship's deck; whence b. of ship means its breadth, and term 'b. ends' means turned on side.

BEAN, seed of certain leguminous plants, as *Vicia*, *Dolichos*, *Phaseolus*, *Glycine*, universally cultivated for food; the broad b. (*Faba vulgaris*) was, with bacon, a favorite Roman dish.

BEAN-FEAST, colloquial term for any kind of jovial feast; probably derived from the old custom of cutting the Twelfth-Night cake, in which a bean was hidden, the receiver of which was declared the king.

BEAR (*Ursidae*), family of Arctoid carnivora; widely distributed except in Australia and Africa S. of Atlas Mts. Arrangement of teeth (molars) facilitates feeding on vegetable diet; plantigrade, entire sole of feet used for walking. Soles of polar bear are covered with hair to prevent slipping on ice. Chief varieties are: common brown b. (*Ursus arctos*), of Europe and Asia; polar b. (*Ursus maritimus*); grizzly b. (*Ursus horribilis*), and black b. (*Ursus americanus*), of N. America; spectacled b. (*Ursus ornatus*), of the Andes; sloth b. (*Ursus labiatus*), of S. Asia and Ceylon.

BEAR, term applied on Stock Exchange to (1) person who, having sold stock not yet in his possession, with idea of buying and delivering it when prices have gone down, seeks to lower prices; (2) stock so sold.

BEAR-BAITING and **BULL-BAITING** brutal form of Eng. sport in vogue from the times of Henry II. until its prohibition in 1835; conducted in amphitheatres called 'bear-gardens,' in which the bear was chained to a stake and worried by bull-dogs. The bull was also frequently tethered, and his nose well peppered to render him more ferocious. Queen Elizabeth used to witness these exhibitions, and the 'Paris Garden' on the Bankside was a noted resort at that period. The sport dates back to the Romans, and was popular throughout Europe.

BEARD, CHARLES AUSTIN (1874), son of William H. and Mary Beard. Educated at DePauw University, 1898.

Oxford University, 1898-9; Cornell University, 1899-1900, and Columbia, 1902-1904. Became adjunct professor of politics at Columbia University in 1907; associate professor and professor to 1915. Director of Training School for Public Service, New York City, since 1917. Author of *Introduction to the English Historians* (1906); *Development of Modern Europe* (with J. H. Robinson) 2 volumes, 1907. *Contemporary American History* (1914); *Economic Origins of Jeffersonian Democracy* (1915).

BEARD, DANIEL CARTER (1850), American artist. Educated at Academy at Covington, Ky., and studied at Art Students League, New York, N.Y., 1880-1884. Has illustrated works for all the leading publishers. Originator and instructor of the pioneer class illustration and teacher of animal drawing at Woman School of Applied Design. This is supposed to be the first organized class in animal drawing in the world. Editor *Recreation*, 1905-1906. President, Society of Illustrators and President Camp Fire Club of America. National Scout Commander and honorary vice president Boy Scouts of America. Originator and founder of the first boy scout society in the United States. Boy scout movement in other countries modeled after Mr. Beard's original society. Author, *American Boys' Handy Book* (1882); *New Ideas for Out of Doors* (1906); *Field and Forest Handy Book* (1906); *Boy Pioneer and Sons of Daniel Boone* (1909); *Dan Beard's Animal Book* (1907); *The Buckskin Book and Buckskin Calendar* (1911); *Boat Building and Boating* (1911); *Shelters, Shacks and Shanties* (1914); *Boy's Book of Wild Animals* (1921). Chief of School of Woodcraft known as Dan Beard Out of Door School. Mt. Beard the peak adjoining Mt. McKinley named after him.

BEARD, WILLIAM HOLBROOK (1825-1900), Amer. artist; member of Nat. Academy of Design; noted for his humorous pictures of animals.

BEARDSLEY, AUBREY VINCENT (1872-1898), an English illustrator and author. Received a grammar school education and began working in London, in 1892. Soon became widely known for his striking posters and book covers. Art editor, 1894, for the *Yellow Book*. Also contributed to *Savoy* and *Le Courrier Francaise*. Illustrated *Bons Mots*, 1892; *Malory's La Morte d'Arthur*, 1893; Oscar Wilde's *Salome*, 1894. He wrote and illustrated the *Story of Venus and Tannhauser*, 1895, and a novel *Under the Hill*, 1896.

BEARDSTOWN, a city of Illinois, in

Cass co. It is on the Chicago, Burlington and Quincy, and the Baltimore and Ohio Southwestern railroads, and on the Illinois River. Its industries include railroad repair shops and the manufacture of flour, cement posts, etc. Its finishing industries are also important. The city has a park, a Carnegie library and a city hall. Pop. 1920, 7,111.

BEARER COMPANY, commissariat and ambulance department of brigade in Brit. army.

BEARING, direction of ship with respect to points of compass, or b. of any mark relative to fore-and-aft line of ship (naut.); part of building resting on support, as beam upon wall, or span between supports (arch.); support which permits moving part of machine to revolve or slide (mech.). The simplest b. consists of block and cap containing two semicylindrical 'brasses' between which the shaft journal rests, and lubrication contrivance to interpose film of oil between journal and brasses. In *thrust block b.*, the journal is provided with collars fitting into circumferential grooves in the brasses, to prevent longitudinal shifting of shaft (e.g. of propeller shaft. *Footstep or pivot b.* supports the entire weight of vertical shaft and must, therefore, be provided with special lubricating apparatus. Friction is considerably reduced by fitting roller or ball b., which are extensively used in cycles and motor-cars.

BEARINGS, BALL. See BALL BEARINGS.

BEAR LAKE (45° 37' N., 67° 5' W.), lake, New Brunswick, Canada.

BEAR LAKE, GREAT (66° N., 120° W.), lake, N.W. Canada.

BÉARN (42° 30' N., 0° 10' W.), ancient province, S. France; united with France by Henry of Navarre; now forms part of department Basses-Pyrénées; capital, Pau.

BEAS, BIAS (31° 56' N., 75° 45' E.), river, Punjab, India; rises in Kulu Mts.; joins Sutlej.

BEATIFICATION, in the R.C. Church an initial stage in the process of canonization.

BEATON, DAVID (1494-1546), Scot. cardinal; s. of John B. of Balfour (Fife); ed. St. Andrews, Glasgow, and Paris; Abbot of Arbroath (1525); Lord Privy Seal (1528); cr. Cardinal by Paul III. (1538); succ. his uncle, James B., as abp. of St. Andrews (1539); became Chancellor of Scotland, and made himself hated by his persecutions of the Protestants; died at the hands of assass-

BEATRICE

sins in the castle of St. Andrews, May 29, 1546.

BEATRICE, a city of Nebraska, the county seat of Gage co. It is on the Big Blue River and on several railroads, and is 40 miles S. of Lincoln. The city has several important institutions, including the State Institution for Feeble Minded Youth. Its courthouse is a handsome structure. Here is also the United States Government building. Its industries include flour and planing mills, barbed wire works, iron foundries, windmills, and farming implements. The city is the center of a rich agricultural community. Pop. 1920, 9,664.

BEATTIE, JAMES (1735-1803), Scot. poet; ed. Marischal Coll., Aberdeen, where he afterwards held chair of Moral Philosophy; chiefly remembered as author of *The Minstrel* (1771-74), a long poem in the Spenserian stanza, and very popular in his day; lived on intimate terms with Dr. Johnson and other literary men of the period who highly valued his character.

BEATTY, DAVID, 1ST EARL, of the North Sea (1871), first sea lord of the Admiralty (1919); entered navy (1884); served in Sudan (1896-8); in China (1900); naval secretary to first lord (1912); one of the youngest seamen to become an admiral (1910); knighted (1914); in command of 1st Battle-cruiser Squadron (1914 - 16); fought battle of Dogger Bank (Jan. 24, 1915), in which *Lion*, his flagship, was incapacitated and forced to withdraw; with 5th Battle Squadron and his Battle-cruiser Squadron sighted von Hipper's five battle cruisers (May 31, 1916) and gave chase, thus opening the battle of Jutland, in which he played the leading part; his tactics and those of Jellicoe's with the battle fleet at variance, and subject of much controversy—Beatty favoring Nelsonian action, Jellicoe, safety first; appointed to command the Grand Fleet (1916-19); lord rector of Edinburgh Univ. (1917); received surrender of German fleet in North (Nov. 1918); promoted admiral of the fleet (April 1919); received great ovation in Paris; awarded Order of Merit (June 1919); an earldom and grant of \$500,000. Married (1901) Ethel, daughter of Marshall Field of Chicago.

BEAU, the leader of male fashion in the XVIII. and early XIX. cent's, the period of wig, patch, powder, enameled snuff-box, satin knee - breeches, etc., which may be studied in Austin Dobson's *Ballad of B. Brocade*. Bath, Tunbridge Wells, Harrogate, Scarborough, and other resorts to which the rank and fashion flocked to take the waters, offer-

BEAUFORT

ed highly organized social enjoyments culminating in the Assembly and presided over by the b.; the b. owed his position largely to his wit, but chiefly to his elegance.

One of earliest was Richard Nash (fl. 1700), who held sway over Bath as master of the ceremonies, (1704-20); George Bryan Brummell (1778-1840), who was raised from lowly rank by the Prince of Wales and flourished until 1816, was accepted by royalties as their superior; the last of the b's was the Frenchman, Alfred, Count d'Orsay (1798-1852), who lived a good deal in England, where he initiated modern dress, and was best known to foreigners through the operas of Mozart and Rossini respectively; inimitable *Memoires*.

BEAUCAIRE (43° 47' N., 4° 39' E.), town, on Rhône, France; formerly center of trade; noted fair; stone quarries. Pop. 9,150.

BEAUCE (48° 20' N., 1° 50' E.), district, Eure - et - Loir and Loir - et - Cher, France; wheat.

BEAUCHAMP, ALPHONSE DE (1767-1832), Fr. author and historian; useful writings on contemporary events.

BEAUCLERK (=good scholar), surname of Henry I. of England.

BEAUFORT, Eng. family prominent in XIV. and XV. cent's, descended from John of Gaunt, Duke of Lancaster, who named his four illegitimate children after his Norman castle of B. The B's were declared legitimate in 1397, but excluded from succession to throne, 1407. The male line became extinct in Wars of Roses.

BEAUFORT, FRANCOIS DE VENDOROME, DUC DE (1616-69), Fr. soldier and courtier; popular nickname, *roi deshaïles*.

BEAUFORT, HENRY (c. 1377-1447), bp. of Winchester and Cardinal, 2nd illegitimate s. of John of Gaunt, Duke of Lancaster; bp. of Lincoln, (1398), of Winchester, (1404); took part of Prince Henry against Henry IV. and was important statesman when former succ. to throne; assisted Pope's party at Council of Constance, (1417), and against Hussites, and was made Cardinal, (1426); retained position under Henry VI., whose misfortunes date from B.'s death.

BEAUFORT SCALE, numbers from 0 to 12 to indicate wind force from calm to hurricane, established by Admiral Beaufort, 1805.

BEAUFORT, WEST (32° 17' S., 22°

20' E.), town and district, Cape Province, S. Africa; sheep-farming. Pop. of district c. 10,000, of town c. 3,000.

BEAUGENCY (47° 46' N., 1° 40' E.), town, Loiret, France; captured by Joan of Arc from English, 1428. Pop. 3,800.

BEAUHARNAIS, Fr. noble family, still represented. Alexandre (1760-94), Vicomte de B., m. Josephine Tascher de la Pagerie, afterwards first wife of Napoleon; elegant manners of old noblesse; served Revolution as general of army of Rhine, (1792), but executed; dau., Hortense, m. Louis Bonaparte, and was mother of Napoleon III.; son, Eugène de B. (1781-1824), Fr. soldier; stepson and favorite of Napoleon I.; served in Napoleon's wars, and became Prince of the empire and Viceroy of Italy; brave and skilful general.

BEAUJEU (46° 10' N., 4° 30' E.), town, Rhône, France; capital of former province of Beaujolais; wine. Pop. 3,400.

BEAUJOLAIS (46° 1' N., 4° 10' E.), district of France in north part of old province of Lyonnais. The fief came to the crown in XVI. cent., but was afterwards settled on Duke of Orleans; B. wines are famous.

BEAULIEU (43° 40' N., 7° 30' E.), village, Alpes-Maritimes, France; winter resort.

BEAUMANOIR, Fr. lordship which gave name to family distinguished in history. Jean de B. was one of heroes of the *Combat des trente* (1351); his successor, Jean (1551-1614), was marshal of France.

BEAUMONT, a city of Texas, the county seat of Jefferson co. It is on the Neches River and several railroads, 80 miles northeast of Houston. It is the head of tidewater navigation and is an important shipping point. There are also important manufactures. In late years Beaumont has become one of the important centers of the petroleum fields of the State, and the Beaumont oil field is one of the largest in the world. Pop. 1920, 40,422; 1923, 46,841.

BEAUMONT (Belmont, Bellemont), name of Eng. family, taken from Beaumont-le-Roger in Normandy; held lands in England, 1086; summoned to Parliament as barons by writ from 1309.

BEAUMONT, CHRISTOPHE DE (1703-81), abp. of Paris; noted for opposition to the Jansenists; pub. a formal condemnation of Rousseau's *Emile*, to which R. replied in his famous *Lettre a M. de Beaumont* (1762).

BEAUMONT, FRANCIS (1584-1616),

and **FLETCHER, JOHN** (1579-1625), Eng. dramatists; described by Swinburne as 'the Dioscuri of Eng. poetry.' B. was the s. of Sir Francis B., Judge of the Common Pleas, and was b. at Grace Dieu, Leicestershire; ed. Broadgates Hall (now Pembroke Coll.), Oxford; left without taking a degree (1600), and entered the Inner Temple to read for the law. In London he made the acquaintance of Ben Jonson and other 'Mermaid' poets, wrote a translation of Ovid and some miscellaneous verses, and formed a friendship with F. The two poets lived together until B.'s marriage in 1613 with Ursula Isley, an heiress. B. was buried in Westminster Abbey. Fletcher was the s. of Richard F., afterwards bp. of London; b. Rye; ed. Bene't (now Corpus Christi) Coll., Cambridge; like many univ. men of the period in search of fortune, drifted into the service of the theatres. He died of the plague.

BEAUMONT, SIR JOHN (1583-1627), Eng. poet; elder bro. of Francis B., the dramatist; best known for his poem on *Bosworth Field*, pub. after his death (1629). He also wrote a long poem, *The Crown of Thorns*, which was greatly admired in MS. (lost).

BEAUREGARD, PIERRE GUSTAVE TOUTANT (1818-93), Amer. general in army of South, and military writer.

BEAUREPAIRE, NICOLAS JOSEPH (1740-92), Fr. commander who slew himself when Verdun was about to fall before Prussians.

BEAUSÉANT, device and standard of knights of Temple.

BEAUSOBRE, ISAAC DE (1659-1738), Fr. Huguenot, scholar, and theologian; wrote valuable *Manichéisme*.

BEAUVAIS (49° 26' N., 2° 5' E.), town, capital of Oise, France; besieged by English, 1433; defended against Charles the Bold of Burgundy by female inhabitants under Jeanne Hachette, 1472; fine Gothic cathedral; Gobelin tapestry. Pop. c. 19,800.

BEAUVAU, Fr. noble family of Anjou; among prominent members was Charles Juste de B. (1720-93), marshal of France.

BEAUVILLIER, name of Fr. noble family prominent XV. to XVIII. cent's.

BEAUVOIR, ROGER DE (1806-66), *nom de plume* of Eugène Auguste Roger de Bully, Fr. novelist of independent means and extravagant habits, who amused himself by writing romantic novels, of which *L'Écolier de Cluny ou le Sophisme* (1832) is considered a good example.

BEAUX, CECILIA H., an American artist, daughter of John Adolphe and Cecilia Beaux. Studied art under William Sartain, the Julien School and the Lazar School, Paris. Awarded LL.D. University of Pennsylvania, in 1908 and A.M. by Yale in 1912. Won Mary Smith Prize, Pa. Academy of Fine Arts (4 times); Dodge Prize, National Academy of Design, Saltus Gold Medal, 1913, Medal of Honor Panama, 1915; Gold Medal Art Institute, Chicago, 1921. Became a National Artist in 1902. Member of the Societaire des Beaux Arts.

BEAUX-ARTS, ÉCOLE DES, a Fr. Government educational institution, for the study of all forms of pictorial or plastic art, open to men and women. It was founded in 1793, or, rather, at that time the Academy of Painting and Sculpture and the Academy of Architects united and formed the institution known under the above name. It received its charter in 1819. Until 1863 it was under the jurisdiction of the Academy of Fine Arts, but in that year it was taken over by the French Government. Students must be between the ages of 15 and 30. The courses cover painting, sculpture, architecture, copper plate engraving and the engraving of medallions and precious stones, both in practice and theory. Before the World War the student body numbered in the neighborhood of 2,000 and the faculty 50. American students have always predominated among the foreigners. The American graduates of the institution have had a powerful influence in the development of American art, especially in the field of architecture, the Congressional Library Building, in Washington, D.C. and the Tribune Building, in New York City, being only two of many examples of the work of its graduates in this country.

BEAUX-ARTS INSTITUTE OF DESIGN, in New York, N.Y., a society organized in 1916 to take over the educational work of the Beaux-Arts Architects, which older society was an organization of American graduates of the Paris Ecole des Beaux-Arts. In 1921-2 the student enrollment was 1336, these being divided among the five departments as follows: Architecture, 900; Sculpture, and life drawing, 320; Mural Painting, 57; and Interior Decoration, 59. The Institute offers scholarships for advanced study abroad.

BEAVER (*Castor fiber*), largest European aquatic rodent, closely related to Amer. b. (*C. canadensis*), valued for fur and as food. Fossil remains found in superficial deposits; *Trogotherium cuvieri* a giant Pleistocene genus.

BEAVERBROOK, RT. HON. WILLIAM MAXWELL AITKEN, 1ST BARON (1879), son of Rev. William and Jean Noble Aitken. Educated at Public Board School, New Castle, New Brunswick, Canada. With Canadian Expeditionary Force, (1915); Canadian Government Representative at the Front, (1916); Officer in Charge of Canadian War Records, (1917). Member of Parliament for Ashton-upon-Lyne, (1910-17). Chancellor of the Duchy of Lancaster and Minister of Information, (1918). Hon. LL.D. New Brunswick University. Created 1st Baron Beaverbrook of New Brunswick and Cherkley, Surrey, in 1916. Author *Canada in Flanders*, (1916-17); *Success*, (1921).

BEAVER DAM, a city of Wisconsin, in Dodge co. It is on the Chicago, Milwaukee and St. Paul, and the Chicago Northwestern railroad. It has important industries including the manufacture of flour, wool, machinery, stoves, etc. There is excellent water power. The city has parks, a library, a hospital, an opera house and an academy. Pop. 1920, 7,992.

BEAVER FALLS, a borough in Beaver co., Pennsylvania. It is on the Beaver River and on the Pennsylvania and New York Central railroads. The city has natural gas and excellent water power for manufacturing purposes. Its industries include the manufacture of steel, iron wire, glassware, pottery, shovels, etc. It is the seat of Geneva College. Pop. 1920, 12,802.

BEAWAR, BEAWR (26° 9' N., 74° 23' E.), town, Rajputana, India; cotton. Pop. 22,000.

BEBEL, FERDINAND AUGUST (1840-1913), Ger. Socialist, of school of Karl Marx; sat in *Reichstag* for over 30 years; was most important member of Social Democrat party.

BEC ABBEY, founded 1034 at Rouen, Normandy, by Benedictine monks; center of civilization; from it came Lanfranc and Anselm, abb's of Canterbury.

BECCAFICO (fam. *Sylvioides*), small bird living on figs and grapes.

BECCAFUMI, DOMENICO DI PACE (1486-1551), Ital. artist; s. of a peasant; displayed remarkable talent for art from earliest years, and, having been well trained, executed great number of religious pictures for churches; famous for share in designing magnificent pavement in cathedral at Siena.

BECCARIA, CESARE DE (1738-94), Ital. philosopher who wrote on amendment of criminal law.

BECHER, JOHANN JOACHIM (1635-82), Ger. chemist and physician; wrote on such varied subjects as metallurgy, physics, a universal language, and commerce. His ideas on combustion induced G. E. Stahl to formulate the Phlogiston Hypothesis.

BECHUANALAND, great dist.; Brit. S. Africa, between Zambesi and Orange Rivers, and between S.W. Africa on the W. and Transvaal on the E. (18°-28° S., 20°-29° E.). Southern part, as far N. as river Molopo, was incorporated with Cape Colony in 1895; rest of district, extending to Victoria Falls on Zambesi, is a protectorate. Surface is part of great central plateau, with elevation of c. 4,000 ft.; rainfall varies from 25 in. in E. to 10 in. in W. Bechuanaland produces corn, millet; great herds of cattle. There seems to be plenty of underground water, and wells and irrigation might render soil very fertile. Gold occurs in places. Cap. Mafeking; area of Cape part, 51,254 sq. m.; pop. 99,500 (including 15,000 whites). Area of Protectorate, c. 275,000 sq. m.; pop. 125,400.

Administration of protectorate is carried out by resident commissioner, under direction of high commissioner. Inhabitants belong to Bamangwato, Bangwaketse, Bakwena, and other tribes each of which is ruled by native chief, under supervision of commissioner. Various missions have been established since beginning of 19th cent., and David Livingstone lived for a time at Kolobeng and carried on explorations. Bechuanaland was included in Brit. possessions in 1885. See MAP AFRICA.

BECK, CHRISTIAN DANIEL (1757-1832), Ger. scholar; prof. at Leipzig Univ.; edit. works of Euripides, Plato, Cicero, and many other classical authors.

BECK, JAKOB SIGISMUND (1761-1840), Ger. philosopher; follower of Kant.

BECK, JAMES MONTGOMERY (1861), graduated at Moravian College at Bethlehem, Pa., in 1880. Given LL.D. degree by Muhlenberg College in 1902 and by University of Pennsylvania in 1910. Admitted to bar in 1884. Practiced law until appointed U.S. Attorney for Eastern District of Pennsylvania in 1896, serving to 1900. Appointed assistant attorney general of the United States, in 1900. In the latter year he became member of law firm of Shearman and Sterling of New York City. Since 1917 the firm has been Beck, Crawford and Harris. Solicitor General of the United States in 1921. Has argued many important cases before the United States Supreme Court including the lottery, Northern Securities, Danbury Hatters,

Bucks Stove, and Consolidated Gas cases. Has been general counsel for American Sugar Refining Company, noted as being one of the most brilliant of present day orators and has delivered orations on several important occasions. Author of: *The Evidence in the Case*, (1914); *War and Humanity*, (1916); *The Reckoning*, (1918); and *The Passing of the Freedom*, (1920). Has been decorated by France and Belgium. Trustee Mutual Life Insurance Company; Director Mechanics and Metals, National Bank.

BECKE, GEORGE LOUIS (1848-1913), Australian author, celebrated for graphic stories of the South Seas, (e.g.) *Pacific Isles*, *The Tapu of Banderah*, etc.

BECKENHAM (51° 24' N., 0° 2' W.), town, Kent, England, 8 miles S.E. of London. Pop. 30,000.

BECKER, GEORGE FERDINAND (1847-1919), son of Alexander C. and Sarah Cary Becker. Graduated from Harvard University in 1868; Ph.D. from Heidelberg in 1869 and graduated from Royal School of Mines, Berlin, 1871. Became instructor Mining and Metallurgy, University of California, 1875. Became U.S. Geologist in Charge, in 1879, serving to 1892. From 1894 to 1919 in U.S. Geological Survey. Author, *Geology of the Comstock Lode*, (1882); *Gold Fields of Alaska*, (1898); *Geology of the Philippine Islands*, (1901). Wrote extensively for technical magazines and scientific society publications.

BECKER, HEINRICH (1770-1822), Ger. actor; for long the idol of the Weimar stage, and was held in great estimation by Goethe.

BECKER, KARL FERDINAND (1804-77), Ger. musical critic and collector; wrote several works on music.

BECKER, WILHELM ADOLF (1796-1846), Ger. classical scholar; b. Dresden; prof. of Archaeology at Leipzig, chiefly known for his *Gallus* (1838) and *Charicles* (1840), clever studies of daily lives of ancient Greeks and Romans.

BECKET, THOMAS (1118-70), abp. of Canterbury, and Chancellor under Henry II.; s. of a London portreeve; member of the household of Abp. Theobald, whom he accompanied to Rome (1143); was made Archdeacon of Canterbury (1154); Chancellor of England (1155). He now became Henry's chief adviser, lived in great magnificence, and encouraged the king in all his warlike enterprises, himself taking a chief part in leading the Eng. army in France. In 1162, upon Theobald's death, Henry appointed him to the See of Canter-

bury, and from this time he gave himself thoroughly to ascetic practices, and became the Church's enthusiastic champion. Refusing his assent to the Constitutions of Clarendon, he was exiled, but returned in 1170. Some hasty words which Henry let fall were acted upon by certain of Becket's enemies, and the abp. was murdered in his own cathedral. He was canonized (1172), and his shrine became a noted place of pilgrimage, as related in the *Canterbury Tales* of Chaucer.

BECKFORD, WILLIAM (1760-1844), Eng. author; s. of William B., who was twice Lord Mayor of London; inherited an income of £100,000 a year, most of which he squandered in extravagant building schemes; famous as the author of *Vathek* (1782), a mysterious Oriental romance, characteristic product of Romantic movement in England. B. was also noted for his eccentricities. He m. Lady Margaret Gordon, and one of his two dau's became Duchess of Hamilton.

BECKHAM, JOHN CREPPS WICKLIFFE (b. 1869), educated Central University of Kentucky, 1884-86. Admitted to bar, 1893. Member of Kentucky House of Representatives, 1894, 1896, 1898. Elected Speaker in 1898. Elected Lieutenant-governor of Kentucky in 1899, and succeeded to governorship on death of Gov. Goebel in 1890. Re-elected governor for term 1903-1907, member U.S. Senate, 1915-1921.

BECKINGTON, THOMAS (1390-1465), Eng. prelate and statesman; sec. to Henry VI.; was sent on an embassy to Calais, 1439, and wrote an account of it in Latin; on his return made Lord Privy Seal, and Bp. of Bath and Wells.

BECKMANN, JOHANN (1739-1811), Ger. scientific author; founder of the science of technology.

BECKWITH, JAMES CARROLL (1852-1917), an American artist. Studied under Carolus Duran and lived in Paris during student years. Returning to New York he taught for years at the Student's League. Was admitted to the National Academy in 1894. Among his paintings the following are especially noted: *Under the Lilacs* and *The Falconer*. He excelled in portraiture and left many noted examples, such as those of Mark Twain and General Schofield.

BECQUE, HENRY FRANÇOIS (1837-99), Fr. dramatist; produced *Michel Pauper* (1870), *Les Corbeaux* (1882), *La Parisienne* (1885), and other plays.

BECQUEREL, distinguished Fr.

family. Antoine César B. (1788-1878), prof. of Physics in Paris; Copley medal of Royal Society of London, 1837, for memoirs on electricity.—Alexandre Edmond B. (1820-91), s., authority on optics, inventor of phosphoroscope.—Antoine Henri B. (1852-1908), s. of preceding; discovered radioactivity (q.v.); Nobel prize, 1903.

BED, article of furniture for sleeping upon. Ancient Egyptian beds were high, and were ascended by steps; early Gk. beds consisted of a wooden frame, with head-board, and across the frame bands of hide were stretched; at a later period the frames were richly inlaid, and the b. coverings were handsomely embroidered. In Europe the b. developed from the simple pallet to the hearse-like structures which is familiar to all visitors to show-places where royal beds are among the curiosities. These unhealthy erections, with little modification, lasted well on into the Victorian era, when they were replaced by metal frames. There is now a widespread tendency to revert to the use of wooden frames, of a plain and light character.

BED (*stratum*), deposit of sedimentary rocks in layers; thin layers are termed *laminae*.

BEDDOES, THOMAS (1760-1808), Eng. physician and scientist; reader in chem. at Oxford (1788); forced to resign because of revolutionary sympathies (1792); established a 'Pneumatic Institution' at Clifton (1798); for treatment of disease by inhalation of different gases, Humphrey Davy being the actual superintendent.

BEDDOES, THOMAS LOVELL (1803-49), Eng. dramatic poet; s. of Thomas B. (q.v.); nephew of Maria Edgeworth; ed. *Charterhouse* and *Pembroke Coll.*, Oxford; author of *The Improvisatore* (1820), *The Bride's Tragedy* (1822), and a posthumous play, the solemn and beautiful *Death's Jest-Book* (1850). His plays are inspired by the Elizabethans, and some of his lyrics, which are of considerable beauty, betray the influence of Shelley.

BEDE, BÆDA (672-735), English historian; usually called 'the Venerable'; author of the *Ecclesiastical History of the English Nation*, written in 731, in the preface of which he gives the history of his own life. In early youth he was placed under care of Benedict Biscop, Abbot of Wearmouth, later under that of Ceolfrith, Abbot of Jarrow, where he spent the remainder of his life; there he was buried, but his bones were removed to Duham during the XI. cent. He has been called 'the father of Eng. history.'

and was undoubtedly the most learned Englishman of his time and chief source of O.E. history. Amongst other works he wrote a *History of the Abbots*, and a scientific treatise, *De Natura Rerum*.

BEDE, CUTHBERT (1827-89), pseudonym of Edward Bradley, Eng. humorist; b. Kidderminster; ed. Durham and Oxford; took holy orders and held various livings; chiefly remembered for *Adventures of Mr. Verdant Green*, an *Oxford Freshman* (1853).

BEDELL, WILLIAM (1571-1642), Anglican Bp. of Kilmore and Ardagh; *Book of Common Prayer* into Ital., and directed trans. of Bible into Erse.

BEDESMAN, a pensioner whose duty it was to pray for the souls of others. In Scotland the king's bedesman, who wore blue gowns and metal badges, were permitted to beg throughout the kingdom. No bedesmen were app. after 1833.

BEDFORD (52° 8' N., 0° 28' W.), county town, Bedfordshire; on Ouse; important for its educational institutions, which originated in the gift of Sir William Harpur, 1561; statue and relics of John Bunyan; agricultural implements, lace, straw-plaiting. Pop. 39,200.

BEDFORD, a city of Indiana and county seat of Lawrence co. It is connected by the Chicago, Indianapolis and Louisville, the Baltimore and Ohio Southwestern and the Terre Haute and Southeastern railroads. The chief industries are the quarrying of stone, manufacture of cement and allied products. It is also the divisional headquarters for railroad supplies and railroad repair shops. Stone is used extensively in town buildings and stores. There are good schools. Pop. 1920, 9,076.

BELVIDERE, SIR, knight of King Arthur's Round Table; appears in Wace, *Robert of Gloucester*, *Malory*, etc., and in Tennyson's *Idylls of the King*.

BEDLAM, generic name for lunatic asylums, derived from the name Bethlehem Hospital, Bishopsgate Street, London, founded as a priory by Sheriff Simon Fitz Mary in 1247, and used as the first lunatic asylum in England about a hundred years later; it was transferred to Moorfields in 1675, and finally to St. George's Fields, Lambeth.

BEDLOE'S ISLAND OR LIBERTY ISLAND, New York harbor, U.S. (40° 41' N., 74° W.); on it was erected Bartholdi's statue of Liberty, presented by France to America on the centenary of independence.

BED OF JUSTICE (Fr. *lit de justice*),

use of prerogative of Fr. monarch to enforce, as supreme power in state, registration of his edicts by recalcitrant *parlements*; supposed to be named after cushioned throne on which king sat on those occasions.

BEDOUINS (Arab; 'dwellers in the open land'), name given to Arab tribes who inhabit the desert; of noble, regular physique; wild and warlike, and of primitive hospitality; played an important part in the World War.

BEDWORTH, town, Warwickshire, England (52° 26' N., 1° 29' W.); coal, iron. Pop. 9,600.

BEE (*Anthophila*), a family of hymenopterous insects having feather-like hairs on head and body; mouth parts modified for sucking nectar from flowers; first legs possess mechanism for cleaning antennae, third legs broadened, and (in workers) modified for gathering pollen; like other Hymenoptera they undergo complete metamorphosis. From primitive 'solitary' species, of curious nesting habits, have evolved the social bees with two kinds of females, reproductive queens and, ordinarily, sterile workers, common hive bee (*Apis mellifica*), domesticated from ancient times, being the common and most highly specialized representative. The differentiation of labor in the wonderful organization of the hive-bee society is less marked in the humble bees (*Bombus*), where the queen, in addition to her egg-laying functions, also assists the workers.

The hive bee swarms in early summer. The workers, after a great commotion, having stuffed themselves with honey and loaded their legs with a resinous substance called *propolis*, fly with a fertilized queen to form a new colony. The workers settle on the proposed site, usually in a hive, and wait for a day till the temperature has risen sufficiently to enable them to exude small plates of wax from eight pockets on the lower side of abdomen. After the wax has been kneaded by the jaws of the workers it is fixed at the top of the hive, and the construction of the hexagonal cells proceeds till the comb is completed. Egg-laying now begins, most eggs receiving fertilized (worker) eggs, others, built larger for the purpose, parthenogenetic (drone) eggs, the queen probably instinctively regulating fertilization. While the eggs in the drone cells develop into drones, stingless males, whose sole function is that of sex, the fertilized eggs give rise to workers or queens according to the food given to the grubs. While the worker grubs are fed with pollen and honey, those destined by the community

to develop into queens are in specially built cells, 'royal cradles,' fed with a more nutritious preparation called 'royal jelly.' Should there be no queen, a new one is developed by the workers by feeding a worker grub on 'royal jelly.' The entire development of a queen, from egg through grub-pupa stage to adult, requires 16 days, that of a worker 21 days, and of a drone 24 days. The older workers gather the honey while the younger ones are engaged in various duties inside the hive, feeding the grubs, ventilating the hive, keeping it clean, repairing cells with *propolis*, fighting alien bees, and destroying the surplus drones, if the hive has a breeding queen. The virgin queen kills her rivals on returning to the hive after having engaged on her nuptial flight, fertilization occurring in mid-air by the strongest and best-flying drone. If a new colony is to be founded, the nuptial flight takes place, and the first queen escapes along with a band of workers. Honey is stored in large quantities for winter consumption.

Bee Keeping.—Bees are most important domesticated animals, not only being providers of honey, but also indispensable for fertilizing flowering plants which are themselves adapted to the insects in the same measure as the latter are modified for collecting nectar. From the earliest times, when a hollowed tree served as a hive, to the straw *skep*, and finally, to the modern scientific bee farm (*apiary*) of N. America, with its annual harvest of many thousands of lbs. of honey, many improvements in bee keeping have led to the latter result. These improvements have been the wooden frame, the artificial comb foundation, and other appliances to direct and aid the bees in completing the comb, the centrifugal honey extractor, which enables the bee-keeper to use the same comb again, and, above all, a greater knowledge of the bees and their diseases.

BEEBE, CHARLES WILLIAM (1877), an American ornithologist, s. of Charles and Henriette Younglove Beebe. Graduated at Columbia University in 1898. Appointed in 1899 honorary curator of ornithology, New York Zoological Society, Director of British Guiana Zoological Station. He has carried on many researches in British Guiana and in the tropics and has written extensively for scientific magazines and publications in addition to his numerous books. Holds membership in British and French Scientific Societies besides ornithological and kindred societies at home. Holder of the Elliott Medal. His books include *Two Bird Lovers in Mexico*, 1905; *The*

Bird, 1906; *Log of the Sun*, 1906; *Our Search for a Wilderness*, 1910; *Tropical Wild Life*, 1917; *Monograph on the Pheasants*, 1918; *Jungle Peace*, 1918; *Edge of the Jungle*, 1921.

BEECH (*Fagus*); genus of trees of temperate regions, containing about 16 species, (e.g.) *F. sylvatica* (Europe), *F. americana* (Eastern N. America), *F. antarctica*, and the evergreen *F. betuloides* (Tierra del Fuego). The fruit (mast) is edible. Ancient Runic tablets were made of h.-wood slabs; the word has same root as Sanskrit *bokaz*, letter.

BEECHAM, SIR THOMAS (1879); Eng. musical composer and conductor.

BEECHER, CHARLES EMERSON (1856-1904), Amer. paleontologist; authority on brachiopoda and crustacea.

BEECHER, EDWARD (1803-1895), an American clergyman. He was the brother of Henry Ward Beecher. After graduation at Yale he entered Andover Theological Seminary. Upon ordination into the Congregational Church he filled pulpits at many New England cities. His first long pastorate was with the Park Street Church in Boston where he remained during the years 1826-1830. In 1844 he assumed charge of the Salem Street Church in Boston and remained here for eleven years. From 1830 to this time he went to the Salem Church; he was President of the Illinois College at Jacksonville. His writings include *The Conflict of Ages*, (1853); and the *Concord of Death*, (1860). While not so gifted as his brother, Henry Ward Beecher, he was noted as a forceful pulpit orator.

BEECHER, HENRY WARD (1813-87), Amer. preacher and abolitionist; pastor of Plymouth Congregational Church, Brooklyn; sermons marked by great originality and eloquence. He was appointed editor of the Christian Union (1870), and visited England in 1863 and 1886, where vast audiences were attracted by his eloquence. He pub. *Seven Lectures to Young Men* (1844), *Life Thoughts* (1858), *Life of Christ* (1871), etc.

* **BEECHER, LYMAN** (1775-1863); Amer. preacher; sometime president of Lane Theological Seminary, Cincinnati; enjoyed great popularity as a preacher; *Collected Works* 3 vols. (1852); *Autobiography*, 2 vols. (1863-4). He was the father of Henry Ward Beecher, Mrs. H. B. Stowe, Edward, Charles, Thomas, and Catherine Esther Beecher, all of whom obtained distinction either as writers or preachers.

BEECHING, HENRY CHARLES (1859), Eng. clergyman and poet;

BEECHWORTH

Canon of Westminster (1902); Dean of Norwich (1911); has pub. *In a Garden and other Poems* (1895); *Seven Sermons to Schoolboys* (1894); has edit. *A Paradise of English Poetry* (1892), *Lyra Sacra* (1894), besides editions of Milton, Crashaw, Herrick, and Henry Vaughan.

BEECHWORTH (36° 22' S., 146° 41' E.), town, Victoria, Australia; gold-mining. Pop. 3,400.

BEECHY, FREDERICK WILLIAM (1796-1856), Eng. explorer; after serving in navy and later in explorations under Franklin and Admiral Smythe, spent three years exploring under his own flag, and pub. (1831) *Voyage to the Pacific and Bering's Strait to Co-operate with the Polar Expeditions, 1826-28*; rear-admiral (1854).

BEECHY ISLAND (74° 40' N., 92° W.), island, Brit. N. America.

BEECHY LAKE (65° 33' N., 105° 50' W.), lake, Brit. N. America.

BEECHY, SIR WILLIAM (1753-1839), Eng. artist; portrait-painter to Queen Charlotte and other members of the royal family; A.R.A. (1793); R.A. and knighthood (1798).

BEE-EATERS, small family of brightly-colored birds (*Meropidae*) which catch their insect food on the wing; they inhabit the Old World; *Merops apiaster* is rare.

BEEF, old pl. Beeves, flesh of ox, bull, or cow, and, formerly, those animals themselves; joints cut by Amer. butchers are sirloin, rump, aitchbone, buttock, mouse buttock, veiny parts, thick flank, thin flank, shin, for ribs, middle ribs, chuck ribs, leg-of-mutton piece, brisket, clod, neck, cheek.

BEEF-EATER.—(1) Hypothetical original O.E. retainer. (2) Yeoman of the Guard, a body first formed by Henry VII.; Tudor costumes still worn. (3) Warder of Tower.

BEEF EXTRACTS appear upon the market in both liquid and semi-solid form and also as bouillon cubes. Beef extract was first produced on a commercial scale by Baron Liebig, in the year 1865, and since that date many similar products have appeared on the market. They are prepared by chopping fresh meat, heating under pressure with a little water, filtering the extract and concentrating by evaporation. According to Liebig's calculations, 34 lbs. of beef should be required for 1 lb. of extract, which should be sufficient to make 70 pints of 'beef tea.' This gave rise to the mistaken idea that a pint of beef tea is equal in nourishment to $\frac{1}{2}$ lb. of beef.

BEEF INDUSTRY

As a matter of fact, the nourishment in beef extracts in any form is almost negligible. They are, however, valuable stimulants, and are also useful as appetizers, but they should not be given to invalids except under a doctor's advice. A good grade of semi-solid extract contains about 20 per cent. water, 3 per cent. salt, 18 per cent. mineral matter, 1 per cent. fat and 68 per cent. meat extractives. These extractives contain a little albumen and peptone, creatin, xanthin, carmine and carnit acid. The last four are neither tissue builders nor energy producers, and therefore cannot be regarded as foods. Bouillon cubes contain from 50 per cent. to 75 per cent. salt, and the fluid extracts are more or less dilute solution of semi-solid extracts. They contain about 50 per cent. of water.

BEEF INDUSTRY, one of the great agricultural industries in the United States conducted on an enormous scale. It is largely concentrated in the West, with its chief centers at Chicago, Kansas City, Omaha and St. Louis. Probably half, if not more, of the livestock slaughtered in the country is done by the large packing houses situated in these cities. The corporations are capitalized at millions of dollars and their operations subject to rigid government control both in regulating their slaughtering in the interests of public health and in the restriction of the great power they possess of monopolizing the country's meat products and dictating prices. The packing houses, however, perform an immeasurable service to consumers in being able to operate modern plants with improved machinery and employ skilled workmen, enabling them to place on the market a great variety of animal products, fresh, cured and canned. The modern packer, in short, with the aid of railroads, stock-yards and refrigeration, has brought the producer and consumer together.

The growth of the American meat industry dates from the opening of the West, where the great ranges offered an enormous field for breeding cattle, sheep and hogs. These animals, as well as other meat-producing species, are bred, raised, fed and prepared for market on a scale which enables the United States not only to provide itself with 143 pounds of meat per capita, that amount of beef being consumed in 1920, but to furnish one-third of the meat supply in international trade. The feeding of cattle is a separate stage of production from that of breeding and raising. The industry's development has produced the professional feeder, who, it has been estimated, fattens more than 80 per

cent. of the cattle killed in the leading abattoirs, purchasing them after maturity, and taking no hand in their up-bringing. The western ranges having bred and raised the cattle, the latter are transported to the feeding area which lie in the corn belt embracing the states of Kansas, Missouri, Iowa, Nevada and Illinois.

The modern meat industry has displaced the small butcher, who thrived in days when cattle were slaughtered near the point of consumption. The butchers did their own killing, needing two or more cattle weekly, and their little shops were numerous. Today the small butchers are rare. The great packing houses can economize in ways beyond their capacity and successfully compete with small independent meat retailers in the remotest parts of the country. In fact, the modern processes of meat production, after slaughter, can only be undertaken in large volume. Such processes involve the preparation and disposal of fresh meats, curing and preservation by salting and smoking and other operations as applied to hams, bacon, etc., preservation by hermetically sealing in various containers, such as cans and jars, and the final sterilization that completes the preparation. The processes produce numerous by-products and important industries have developed through utilizing parts once wasted. These by-products of cattle slaughtered including fertilizing material, bones (used for handles of various utensils, such as knives), glue, soap and soap powder.

Of late years the industry has had a remarkable expansion. The U.S. census of 1920 showed figures of growth of slaughtering and packing houses, from 1914 to 1919, as follows:

Establishments, 1914, 1279; 1919, 1304; Wage earners (average number), 1914, 98,832; 1919, 160,996; capital invested 1914, \$534,273,563; 1919, \$1,176,483,643; wages paid, 1914, \$62,135,722; 1919, \$209,489,263; value of products, 1919, \$1,651,965,424; 1919, \$4,246,290,614.

In 1921 the total number of animals slaughtered amounted to 62,172,856, of which 38,982,356 were under federal inspection. The country's total consumption of meat for that year was 15,624 million pounds, or 144.8 per capita, comprising beef, 57.7 pounds; veal, 8 pounds; mutton and lamb, 6.3 pounds, and pork 72.8 pounds per capita.

BEEFSTEAK CLUB, otherwise 'The Sublime Society of Steaks,' founded by John Rich at Covent Garden Theatre, which besides royalties, numbered amongst its members Hogarth, Garrick,

and Wilkes. The club met later at the Bedford Coffee-House and the Lyceum Theatre.

BEEKS, GERTRUDE BRECKENRIDGE (MRS. RALPH M. EASLEY) (1867), an American sociologist, daughter of James and Sarah Beeks. Educated in public schools of Fort Wayne, Ind., and Chicago, Ill. President of National Association of Women Stenographers and President National Association of Business Women from 1894-1903. Head of sociological department of McCormick Harvesting Machine Co. and since 1903 director Welfare Department, National Civic Federation. Has been instrumental in bettering conditions in various phases of labor.

BEELZEBUB, a name of uncertain derivation. In 2 Kings 1 we find mention of Baal-zebub, the god of Ekron; while in Mark 3:27 B. is identified with the devil, and of Christ it is said by the scribes, 'He hath Beelzebub, and by the prince of the devils casteth he out devils.' In Milton's *Paradise Lost* (Bk.ii.) B. ranks as second to Satan.

BEER, THOMAS (1889), graduated at Yale in 1911. Studied law at Columbia during 1911-13. During World War enlisted in Field Artillery on May 10, 1917, serving during war in 3rd and 21st Field Artillery. Commissioned 1st lieutenant, Jan. 1918. A writer principally of short stories, many of which have appeared in the Century, Saturday Evening Post, Smart Set and other magazines.

BEERBOHM, MAX (1872), Eng. essayist and caricaturist, is a half-brother of Sir Herbert Tree; his literary work is marked by whimsical humor and by delightfully easy style; and as a caricaturist he is a master of biting portraiture. He pub. *The Works of Max Beerbohm*, *The Happy Hypocrite*, *The Poets' Corner*, *Fifty Caricatures* (1913).

BEER MONEY, payment made in Brit. army, 1800-73, to non-commissioned officers and privates in lieu of allowance of ale.

BEERNAERT, AUGUSTE (1829-1912), Belgian statesman, successively minister of agriculture and industry, minister of finance, and president of the cabinet; led the Catholic Democrat party; Nobel peace prizeman (1910).

BEERS, HENRY AUGUSTUS (1847), s. of George W. and Elizabeth Beers. Graduated from Yale in 1869, given M.A. degree in 1887. Tutor at Yale in 1871 to 1874, assistant professor in English literature since that date. Has written, besides his many books, extensively for the magazines. His better

known books are *From Chances to Tennyson*, 1890; *Initial Studies in American Letters*, 1891; *A History of English Romanticism in the 18th Century*, 1899; and *the 19th Century in 1901; Points of Issue*, 1904; *The Two Twilights* (verse) 1917; *Four Americans*, 1919; *The Connecticut Wits*, 1920; and *Poems*, 1921.

BEERSHERA (31° 17' N., 34° E'), most southerly village in Canaan; mentioned in Old Testament from times of Abraham; 'from Dan even unto B.' meant the whole of Palestine; site marked by ruins and two circular wells.

BEESWAX, secretion of worker bees when forming honeycomb of which it it composes cells.

BEET (*Beta vulgaris*), edible biennial, forming succulent tap-root first season, flowering stem following year; numerous varieties, e.g. field b., garden b. mangold-wurzel. From certain varieties sugar is obtained.

BEET SUGAR, manufactured from the juice of the sugar beet as cane sugar is made from the juice of the sugar cane. The possibility of making sugar crystals from this particular variety of beet was discovered as long as 1747, by a German chemist, Margraf, but it was more than a century later before the discovery held anything but a theoretical interest. In the middle of last century an attempt was first made in Germany to employ the formula for commercial purposes. Similar attempts were made in this country, but it was not till 1870 that a factory was established, in Alvarado, Cal., and it was 1879 before this venture was firmly established as a paying business. From that time the demand for the commodity grew much faster than the supply, as it was cheaper to manufacture than cane sugar. The difficulty was in obtaining a supply of raw material. American farmers before the 90's working with big areas of virgin soil, and unable to obtain a suitable supply of labor, preferred to raise grains and such other crops as were tilled wholesale by machinery. These conditions did not change till near the end of the century, when most of the best land was permanently settled and agriculture necessarily had to adjust itself to more intensive methods. In 1896 there were still only seven beet sugar refineries in the United States, producing 42,000 tons of finished product a year. In 1917, however, this number had risen to over a hundred, producing 850,000 tons a year and employing, all told, 50,000 men. The scarcity of sugar during the after the war period acted as a powerful stimulus on the growth of the industry

obvious from the following figures: In 1920, when the sugar scarcity was at its height, slightly over 1,000,000 tons of beet sugar was produced in the United States, as compared to a little over 122,000 tons of cane sugar. Since then the production has dropped. In 1922 the production of beet sugar was 674,000 tons.

BEETHOVEN, LUDWIG VAN (1770-1827), Ger. composer; born at Bonn; s. of a tenor singer at the Elector of Cologne's court, a man of violent temper and drunken habits, with the natural result of the family suffering dire poverty during Ludwig's early years. The father, discerning the precocity of his son was eager to turn his musical gifts to profit at the earliest possible date, and commenced the child's training at the age of five. By the time he was nine, however, the elder Beethoven could teach him no more, and he passed successively into the hands of another singer, Pfeiffer, Ries Van den Eeden (the court organist), and his successor Neefe. As early as 1781 Beethoven had acted as deputy to the latter; in 1783 he was made cymbalist at the Bonn theatre and in the following year was given a court appointment under Neefe. In 1787 he visited Vienna where he played before Mozart and received a few lessons from him. But the illness of his mother to whom he was greatly attached and her subsequent death, put an end to these advantageous studies, and he returned to his work at Bonn and the charge of his father's household, of which he was the chief support. In his native town he had won the friendship of Count Waldstein, through whose instrumentality the elector was induced to send Beethoven again to Vienna (1792) where he quickly made a reputation for himself by his playing and extemporization.

Vienna was destined to be his home for the remainder of his life, and immediately after settling there he placed himself under the tuition of Haydn. Beethoven, however, did not get comfortably with his tutor, and was dissatisfied with his progress. He therefore took lessons from Schenk and studied counterpoint later with Albrechtsberger and the violin with Schuppanzigh. It was in Vienna consequently that all his chief works were composed and in this great musical center he formed many lasting friendships.

To Beethoven's first period belong: first two symphonies first 10 sonatas (including *Pathétique* 1799, and *Moonlight*) string trios first 8 string quartets, *Mount of Olives* (oratorio), and most of the sets of variations for pianoforte.

Second period includes most of his greatest works—e.g., *Kreutzer* Sonata (violin and piano) 1803; 3rd *Eroica* Symphony, 1804; *Fidelio* (opera) 1805; *Appassionata* Sonata, 4th Symphony, and 32 Variations in C minor for Pianoforte, 1806; C minor for Pianoforte, 1806; C minor (5th), and *Pastoral* (6th) Symphony, 1807; and G minor Pianoforte Concerto, 1807; Violin Concerto and *Lebewohl* Sonata, 1809; music to *Egmont* and trio in B flat, 1810; Symphonies 7 and 8, 1812. To the last period belong 9th (*Choral*) Symphony (1823 onwards); last 4 pianoforte Sonatas, last 4 string quartets, *Missa Solemnis*, 2 overtures, and other minor works.

BEETLE, coleopterous insect. Black b's are cockroaches, not true b's.

BEGAS, KARL (1794–1854), Ger. artist; painted Biblical and hist. pictures, and portraits of public men; was court painter to the king of Prussia.

BEGAS, REINHOLD (1831–1911), Ger. sculptor; s. of Karl B.; has executed statues of Schiller, von Humboldt, and Bismarck, for Berlin; the sarcophagi of the Emp. Frederick III. and the Empress Frederick; and the national monument to the Emp. William at Berlin.

BEGBIE, HAROLD (1871), s. of Rev. Mars Hamilton Begbie, an English author. He has been a prolific writer. His publications include the following: *The Handy Man*, 1900; *The Fall of the Curtain*, 1901; *The Curious and Diverging Adventures of Sir John Sparrow*, 1902; *Bundy in the Greenwood*, 1902; *The Priest*, 1906; *The Cage*, 1909; *The Gateway*, 1909; *In the Hands of the Potter*, 1911; *Millstone*, 1915; *Workshops of Destruction*, 1915; *The Vindication of Great Britain*, 1916; *The Proud Citizen*, 1917; *An English Family*, 1919; *Life of William Booth, Founder of the Salvation Army*, 2v. 1920; *The Ways of Laughter*, 1921.

BEGGAR, one who exists on charitable contributions. The word is of uncertain origin, but its use in England dates back to the XIII. cent.

BEGHARDS, lay male confraternity which flourished in Europe XIII. and XIV. cents.; modelled on Béguines.

BEGIN, LOUIS NAZAIRE (1840), R.O. Archbishop of Quebec, cardinal since 1914; author of *Aide-Memoire*, a chronology of Canadian history (1886).

BEGONIA, genus of succulent herbs, comprising about 350 species; native of moist tropics.

BÉGUINES, lay sisterhoods founded at Liège about 1170 by a priest named

Lambert le Bègue, who devoted his fortune to establishment of church and hospital there; the B. were not required to take vows, but expected to devote their whole time to good works; movement very popular, and spread rapidly. A Béguinage at Ghent, at the present time, numbers some hundreds of sisters.

BEGUM, Indian title of honor bestowed on mother, sister, and wife of ruler.

BEHAIM, MARTIN (c. 1436–1507), Ger. navigator and geographer; made globe of world, 1492, kept at Nuremberg.

BEHERA, prov.; Lower Egypt; cotton. Area, 1,725 sq. m.; pop. 800,000. Cap. Damamhur.

BEHISTUN, vil.; Ardelan, Persia (34° 24' N., 47° 28' E.); famous rock (1,700 ft.) with cuneiform inscriptions 300 ft. above base.

BEHN, MRS. APHRA (1640–89), Eng. novelist and dramatist; probably first Eng. professional authoress; visited W. Indies in childhood, and hence her best novel, *Oroonoko, the Royal Slave*; employed by Charles II. as a spy in Holland; plays include *The Forced Marriage*, *The Town Fop*, *The American Prince*. Work lively, witty, and coarse.

BEHR, WILLIAM JOSEPH (1775–1851), Ger. publicist; was accused of disloyalty to Maximilian I. of Bavaria; author of several works of a socialistic tendency.

BEIRA—(1) (40° 30' N., 7° 50' W.); province Portugal; area 9208 sq. miles. Pop. 1,550,000. (2) (19° 50' S., 34° 55' E.), seaport town, Portug. E. Africa; built on tongue of sand at mouth Pungwe River; nearest port to Mashonaland; B. railway links up with Cape to Cairo line at Bulawayo. Pop. 8000.

BEIRUT. (1) Seapt. Syria (33° 54' N., 35° 31' E.); univ. astron. observatory; silk goods gold and silver thread; entrepôt for exports and imports of central Syria. Anc. Phœnician town; captured by Turks (16th cent.); entered by Allenby's 7th Division (Oct. 1918); placed under Fr. administration (Dec. 1919). (2) Vilayet Syria. Area, 6,180 sq. m.; pop. c. 600,000.

BEISAN. See ARCHAEOLOGY.

BEIT, ALFRED (1853–1906), S. African financier; b. Hamburg; associated with Cecil Rhodes in De Beers; partner in firm Wernher, Beit, & Co., and director of the Rhodesia and other railways; founded chair of Colonial History at Oxford (1902), and left large bequests

for educational purposes to London Univ., Hamburg, Capetown and Johannesburg.

BEITH, JOHN HAY (1876); an Eng. writer under the pen name of 'Ian Hay'. Educated at St. John's College Cambridge. Served during World War with Argyll and Sutherland Highlanders 9th Division with rank of Captain. Has written a number of books and plays the better known being: *Pip* (1917); *The Right Stuff* (1908); *A Man's Man* (1909); *A Safety Watch*, (1911); *Happy-Go-Lucky* (1913); *A Knight on Wheels* (1914); *The Lighter Side of School Life* (1914); *The First Hundred Thousand* (1915); *Carrying On*, (1917); *The Last Million*, (1918), the last dealing with the war; *The Willing Horse*, (1921); and *A Baker's Dozen*, (1922). His plays include *Tilly of Bloomsburg*, (1919), and *A Safety Match* (1921).

BEJA, collective name for numerous Hamitic tribes of nomads who in ancient times, ranged over entire stretch of country between Nile and Red Sea; all Muhammadans, of polygamous habits; noted for physical beauty.

BEJAR (40° 20' N., 5° 39' W.); town, Spain. Pop. 10,000.

BEJAR, SIERRA DE (40° 17' N., 5° 35' W.), mountain range, Spain.

BÉJART, ARMANDE CLAIRE ELIZABETH (1645-1700), Fr. actress; wife of Molière, who wrote many leading parts for her; outlived Molière and afterwards m. an actor named Guérin. Her sister, Madeleine B. (1618-72), was also a prominent member of Molière's company.

BEK, THOMAS (d. 1293); Lord Treasurer of England under Edward I.; bp. of St. David's (1280).

BEKE, CHARLES TILSTONE (1800-74), Eng. traveller and author; travelled extensively in Abyssinia, Syria, Palestine, and Egypt; pub. *The Nile and its Tributaries* (1847), *The Sources of the Nile* (1860), *The British Captives in Abyssinia* (1865).

BÉKÉS, towns, Bekés Co., Hungary. (1) Békes-Gyula (46° 46' N., 21° 8' E.), cap. of co.; cattle, corn, wine. Pop. 27,000. (2) Békes-Csaba (46° 40' N., 21° 5' E.); milling, hemp weaving; important ry. in. Pop. 43,000.

BEKKER, IMMANUEL (1785-1871); Ger. philologist; pioneer of diplomatic criticism in his editions of Gk. and Lat. classics.

BEL, signifying 'lord' or 'master'; principal Babylonian deity, whose tem-

ple was in the sacred city of Nippur; cf. Baal.

BEL AND THE DRAGON, usually considered apocryphal book of Bible, though accepted by Council of Trent (1546) as chapter XIV. of Daniel.

BELA III. (d. 1196), king of Hungary; s. of Gelza II., grandson of Bela II.; adopted by Manuel, emperor of Constantinople, who afterwards, however, had a son. He succ. as king of Hungary, 1173, on death of his bro. Stephen; distinguished by his Byzantine tendencies.

BELA IV. (1206-70), king of Hungary; s. of Andrew II., grandson of Bela II.; succ. in 1235; one of most energetic kings of Hungary; previously headed revolts against oppression of Andrew II., and forced him to sign the Golden Bull, 1222; as king suppressed aristocratic misrule; driven from Hungary by Mongols, 1241, and forced to colonize country on his return.

BELLAIRE, a city of Ohio, in Belmont co. It is on the Ohio River and on several important railroads, 5 miles south of Wheeling, W. Va. It is the center of an important mining and quarrying region and has manufactures of stoves, glass, carriages and boilers. There are several banks, newspapers and a number of educational institutions. Pop. 1920, 15,061.

BELA KUN, See KUN, BELA.

BELASCO, DAVID (1859), an Amer. dramatist, son of Abraham and Reina Martin Belasco. Graduated from Lincoln College, California, in 1874. Began his stage career as stage manager of Baldwin Grand Opera House and Metropolitan Theatre in San Francisco, Cal. In 1880 became stage manager of Madison Square Theatre where he made a great success. Remained with Madison Square Theatre until 1887 going then to manage Lyceum, where he again made striking changes which greatly added to his reputation as a manager. He is now owner and manager of Belasco Theatre, New York. He presented E.H. Sothern as Lord Chumley in 1887; Mrs. Leslie Carter in the *Heart of Maryland* in 1895; *Zaza*, in 1896 and 1900; Blanche Bates in *Naughty Anthony*, in 1899; *Madame Butterfly* in 1900; *Du Barry* in 1901; Henrietta Crossman in *Sweet Kitty Bellairs* in 1903; David Warfield in *The Music Master*, in 1904; *The Girl of the Golden West*, in 1905; *The Easiest Way*, in 1909; *The Return of Peter Grimm*, in 1911; *The Secret*, 1912; *The Heart of Watona*, in 1916; *Polly with a Past*, in 1917; *Daddies*, in 1918; *Ina*

Claire in *The Gold Diggers* in 1919; Frances Starr in *One*, in 1920; David Warfield in *The Return of Peter Grimm*, in 1921; Lionel Atwill in *The Grand Duke*, in 1921, and Lenore Ulrich in *Kiki*, in 1921. He was the author of many plays, the more prominent being *Lord Chumley*, *The Charity Ball*, *The Girl I Left Behind Me* (with Franklin Fyles), *the Heart of Maryland*, *Du Barry*, *The Girl of the Golden West*, *the Return of Peter Grimm*, with many adaptations of other plays. In 1923 he entered into an agreement with prominent moving picture interest to turn over for screen purposes many of his plays and productions.

BELBEIS (30° 24' N., 31° 35' E.); town, Egypt. Pop. 11,500.

BELCHER, SIR EDWARD (1799-1877). Eng. admiral, Arctic explorer, and writer.

BELÉM—(1) (38° 41' N., 9° 14' W.); town, Portugal. (2) (7° 8' N., 61° 35' W.), town, Venezuela. (3) (23° 33' S., 57° 8' W.), town, Paraguay. (4) 25° 9' S., 54° 34' W.), town, Brazil. (5) (1° 28' S., 48° 24' W.), town, Brazil. Pop. 275,200.

BELFAST, largest town, Ireland (54° 36' N., 5° 55' W.); port and great commercial centre of Ulster, on Belfast Lough, 12 m. from Irish Sea; headquarters of linen trade in U.K.; has also great shipbuilding yards, which have produced some of the largest steamships, including *Oceanic*, the ill-fated *Titanic*, and the *Britannic*, torpedoed (1916) off Greek coast while serving as a hospital ship. Industries include distilling, brewing, ironfounding, flour milling, bacon curing, making of rope, blacking, sailcloth, aerated waters; harbor very large and safe; there are four graving docks. There is a Prot. cathedral, begun in 1899; a R.C. cathedral; univ. (Queen's Univ., 1909—founded as Univ. Coll. in 1849); R.C. and two dissenting colleges. Public buildings include magnificent city hall, Ulster Hall, free library, museum. Belfast is centre of Prot. anti-Home Rule sentiment in Ireland. Has unenviable reputation for riots (1886, 1893, 1898, 1907, 1920 and 1921.) Pop. 385,400. See IRELAND, FREE STATE OF, ULSTER.

BELFAST, a city in Maine, the county seat of Waldo Co. It is at the head of Penobscot Bay and is on the Maine Central Railroad, 130 miles north of Portland. The city has a fine harbor and is a port of entry. It has a large trade and important manufactures, including shipbuilding, which was begun here in 1783. Belfast was settled in 1770. In

1815 it was captured by the British. Pop. 1920, 5,063.

BELFORT. (1) Terr., E. France, dep. of Haut-Rhin (47° 38' N., 6° 53' E.); cereals, iron, machinery, cloth. Area, 235 sq. m.; pop. 101,000. S. of Vosges lies the pass Trouée de Belfort. (2) Fort. tn., E. France (47° 38' N., 6° 53' E.); important strategical position near Swiss frontier; high citadel; belonged for a time to Austria, but acquired by France in 1648; fortified by Vauban (1688); often besieged in wars of 17th and 19th centuries; surrendered to Germans after three months' siege, Feb. 1871; *Lion of Belfort*, by sculptor Bartholdi, commemorates the siege; fortifications since rebuilt; fine church and *palais de justice*; industries include cotton spinning, tanning, brewing, machinery; considerable export and import trade; frequently bombed by Germans in Great War. Pop. 39,400.

BELFRY (from Ger. *bergfriede*, place of refuge), crenellated portion of church; meaning lost later in sense of bell-tower.

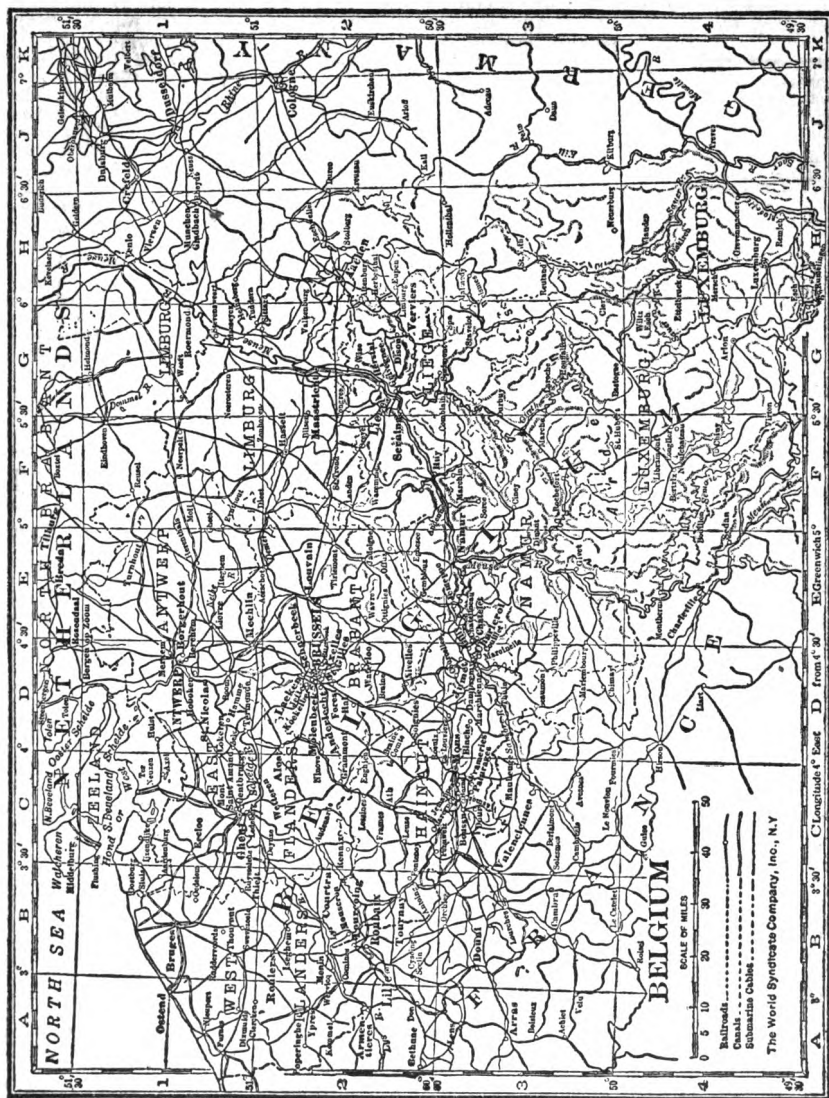
BELGÆ, inhabitants of *Gallia Belgica*, the district of Gaul between the Marne, Rhine, Seine, and North Sea; described by Caesar as most warlike Germanic people.

BELGAUM (15° 50' N., 74° 31' E.), town (and district), Bombay; military cantonment; fort captured by British, 1818; cotton mills. Pop. 36,900. Area of district, 4,649 sq. miles. Pop. 1,100,000.

BELGIOJOSO (45° 9' N., 9° 19' E.), town, Lombardy, Italy, which gives name to family of B. Cristina, Princess of B. (1808-71), was prominent patriot and author. Pop. 3,830.

BELGIUM, kingdom, Europe (49° 30'-51° 30' N., 2° 32'-6° 7' E.), bounded N. by Netherlands, E. by Netherlands, Prussia, and Luxembourg, S. and S.W. by France, N.W. by North Sea; length, c. 170 m.; width, c. 108 m.; area, 11,373 sq. m. Surface is flat and low-lying except in S.E., where Ardennes rise to 2,000 ft.; coast districts, in some places below sea-level, protected by sand-dunes and dykes; along Dutch border is marshy tract called Campine, with woodland and good agricultural ground; drained by Scheldt and Meuse (Maas), with tribes.—of former, Lys, Dender, Durme, Rupel; of latter, Sambre and Ourthe. Climate resembles that of S. of England; rainfall varies from 28 to 40 in.

History.—Originally Belgium was inhabited by people of Celtic race, who were expelled by Germans; latter were



in turn conquered by Romans, who remained here for several centuries, but were ultimately expelled by Franks; Belgium formed part of Charlemagne's empire; by Treaty of Verdun in 843 eastern provinces became duchy of Alsace-Lorraine, and western (see FLANDERS) fell to France; subsequently various principalities arose, and history was one of factions and rivalries between different families, towns, and provinces. Most of states were ultimately united under dukes of Burgundy, and in 1477 they passed to Habsburgs by marriage of Mary, daughter of Charles of Burgundy, to Maximilian, who later became emperor. Their son, Philip, governed Netherlands for a time, and was succeeded by his sister, Margaret of Austria, who was regent from 1507-30; under her nephew, Charles V., Emperor and King of Spain, those adopting Reformed religion were persecuted, and country was formally united to Spain; he abdicated in 1555, whereupon his son, Philip II. of Spain, succeeded; he continued persecution of heretics, and during regency of his half-sister, Margaret of Parma, various outbreaks occurred against Spanish rule; Alva, sent to reduce rebels, accomplished his task with such cruelty that result was revolt of all Netherlands in 1568; this ended in establishment of northern provinces as kingdom of Holland, while southern region (Flanders) remained under Spain. Belgium was given to Clara Isabella Eugenia in 1598 by her father, Philip II., on her marriage with Archduke Albert of Austria, at whose death in 1621 it returned to Spain. In later 17th cent. some provinces were lost to France, but by Treaty of Rastadt in 1714 they passed to Austria. Under the Archduchess Marie Elizabeth (1725-41), Charles of Lorraine (1741-80), and Archduchess Marie Christina (1781-92) country enjoyed considerable prosperity; though in 1789 there was revolt, which was suppressed. During Fr. revolutionary wars Austria suffered many defeats, and in 1814 Belgium was ceded to France. On fall of Napoleon it was, by Treaty of London and Congress of Vienna, united with Holland as kingdom of Netherlands under William of Orange. Result was not satisfactory, and in 1830 an insurrection broke out at Brussels and spread over whole of Belgium, resulting in revolution and separation of Belgium from Holland once again. Ultimately Leopold of Saxe-Coburg-Gotha was chosen as King of Belgium, and assumed crown in 1831. For some time after this Holland refused to recognize Belgium as separate kingdom, and sent an army to occupy Antwerp; but, owing to Fr. intervention

it had to withdraw in 1832. Leopold I. died in 1865, and was succeeded by his son, Leopold II., who founded the Congo Independent State (1885). The annexation of the state to Belgium was provided for by treaty in 1907. Leopold [died in 1909, and was succeeded by his nephew, the present king, Albert I. The neutrality of Belgium was placed under the guarantee of Austria, Russia, Britain, and Prussia by the Treaty of London (1839). For the tragedy of Belgium during 1914 and subsequently, see below.

Belgium is limited monarchy; Parliament consists of senate of 120 members and House of Representatives of 186 members. See MAP BELGIUM.

Resources and Productions.—Belgium has over 5,400 m. of railways, chiefly under state control. Principal railway centers are Malines, Brussels. Scheldt and Maas are navigable; many canals. Forests cover about one-sixth of surface, and about two-thirds are cultivated; chief crops, wheat, rye, oats, barley, potatoes, beet, hemp, flax, tobacco, hops, chicory, madder. Horses are bred; honey is produced, silkworms reared. Minerals include coal, iron, lead, zinc, copper, manganese, calamine, E. and S.E. districts being rich in ores. The coalfield, practically continuous with industrial region, crosses country from Fr. frontier near Condé to further extremity at Herve, near Aix-la-Chapelle. Deposits also exist in Campine. Belgium is preeminently a manufacturing country, and has many important industrial towns, while Antwerp is one of the greatest shipping and manufacturing centers in N. Europe. The country's commercial prosperity is largely due to Leopold I. and Leopold II., the former having had a great struggle with commercial conservatism of country. Metal manufactures are valuable and numerous, including machinery, firearms, cannon, wire, gold, silver, tin, brass, and copper goods. Other industries are linens, lace, woollens, carpets, cottons, silk, velvet, hosiery, glass, paper, leather, gloves, sugar, brewing, distilling, fisheries. Chief manufacturing towns besides Antwerp are Liège, Brussels, Ghent. Exports include sugar, glass, cottons, linens, woollens, fruit, flour, oils, coal, coke, grain, chemicals, iron, steel, machinery, diamonds, caoutchouc; imports, raw materials for textile trade, hides, rubber, dyes, wine, soap, hops, meat, grain, wheat, coffee.

Population.—The Belgian population consists of two distinct types, differing from each other both in physical and moral characteristics and in geographical situation. In agricultural N. are the Flemish; in industrial S. are Walloons. Belgium is one of most densely populated

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countries of the world (652.9 per sq. m.); hence importance of Belgian Congo. Chief religion is Roman Catholicism; there are a few Protestants and Jews. Women received the parliamentary vote in Mar. 1920. Primary education is free; Brussels and Louvain have free universities, Ghent and Liège state universities. French and Flemish are equally spoken. Pop. 7,500,000 (2,833,000 French-speaking; 3,220,000 Flemish-speaking; and 871,000 speaking both languages).

German Invasion of Belgium.—At the outbreak of the Great War Germany violated the neutrality of Belgium, which was guaranteed by the treaties of 1839, after making a vain demand that no obstacle be offered to the passage of her troops through that country. On the morning of Aug. 4, 1914, the first Ger. troops crossed the Belgian frontier; the same evening the Belgian Government appealed for aid to Britain, France, and Russia. It was this wrong committed against Belgium, which the Ger. chancellor sought to excuse on the score of 'necessity,' that decided the Brit. Government to declare war on Germany.

On Aug. 5 the Germans began the attack on the fortress of Liège, and on the following day the 3rd Division of the Belgian army, after fighting forty-eight hours against an enemy four times its superior in numbers, was obliged to retire in order to escape being surrounded. General Leman, governor of the town, took up his quarters in Fort Loncin, and speedily organized a defence. By Aug. 10 the Germans had moved their siege guns into position. The forts held out till the 16th and 17th. General Leman was taken prisoner, being removed in an unconscious condition from the ruins of Fort Loncin. The defence had arrested the first push of the enemy for several days, and cost him about 48,000 men. A second appeal to the Belgian Government to cease resistance was refused.

From Aug. 6 to 20 the Belgian army was concentrated on the Geete, covering Brussels and Antwerp. It fought many gallant delaying actions, notably at Haelen, but by Aug. 18 hope of a junction with the Franco-Brit. armies on the line Geete-Namur-Meuse was lost, and the bulk of the army withdrew to the entrenched camp of Antwerp (Aug. 20). On Aug. 21 the Germans began the attack on Namur; two days later the forts had been put out of action; the Belgian 4th Division was in retreat, threatened in flank and rear, and only half of it managed to reach France, when it was taken to Antwerp. The function of the Belgian forces was now

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to threaten the Ger. communications through their country, and from Aug. 2 onwards they engaged in a series of offensive sorties, particularly during the battle of the Marne (Sept. 9-13). Finally, at end of month, the Germans decided that the menace must be removed, and the siege of Antwerp began. It lasted till Oct. 10, being prolonged by the assistance rendered by the Brit. Naval Division, but at the expense of considerable losses in the retreat across the Scheldt to Ostend. On Oct. 15 the Belgian army, now reduced from 120,000 to 80,000, took up a front along the Yser on the extreme left of the Allied line. From Oct. 18 to 30 it fought a desperate action to prevent the Germans from gaining the passage of the Yser and so turning the Allied flank, finally prevailing by inundating the country. This long and heroic resistance cost 14,000 casualties, but it gave time to the Allies to constitute a front against which all the assaults of the enemy were destined to be broken.

The Belgian troops continued to hold that little corner of their native soil till, in the autumn of 1918, the hour of deliverance came. On Sept. 28 they joined in the general Allied offensive; on Oct. 17 occupied Ostend; on Oct. 19 Bruges; and by Oct. 20 the whole of the Belgian coast was free of Germans. The armistice of Nov. 11 saw the end of Ger. domination, and on Nov. 25 King Albert re-entered his capital in triumph.

The invasion and occupation of Belgium was accompanied by numerous atrocities and illegalities. The crimes of Termonde, Aerschot, Dinant, Louvain have besmirched the Ger. name for all time. More than 5,000 civilians, among them priests, women, and infants were killed; besides provisions and manufactures, industrial equipment of all kinds was seized; illegal war contributions were exacted; a policy of dividing the Flemings and the Walloons was carried out; and, as a final outrage, the male population, by an order issued on Oct. 3, 1916, was deported *en masse* and subjected to industrial servitude in Germany or compelled to do military work behind the front, exposed to the fire of the Allied artillery. But the fortitude of the Belgian nation remained unshaken through all their misfortunes. The names of General Leman; M. Max, burgomaster of Brussels; Cardinal Mercier, Archbishop of Malines; Théodor, president of the advocates of Brussels; and, above all, King Albert I., live as noble embodiments of the finest qualities of the Belgian people.

Belgium recovered rapidly from the effects of the war in the years imme-

diately following. Germany was required to return the machinery and live stock which had been taken away during the war. About 10,000 persons were added to the population in 1919 by the cession of Moresnet and a part of Malmady by Germany, and the district of Uepen, with the remainder of the district of Malmady was ceded by Germany and annexed by Belgium on September 20, 1920 following a plebiscite. This added a further 50,000 to the inhabitants. In 1919, 1920 and 1921 King Albert and Queen Elizabeth made visits to several of the Allied countries including the United States. They were received with the greatest enthusiasm. In 1922-3 Belgium took the part of France in negotiations regarding the forceful collection of German reparation, and in Jan. and Feb. 1923, Belgian troops occupied a part of the Ruhr district. Belgium took an important part in the Conference on the Limitation of Armaments (q.v.) in 1921-2.

BELGRADE, cap. of Jugo-Slavia (44° 49' N., 20° 29' E.), at confluence of Danube and Save; has cathedral, royal palace (scene of murder of King Alexander and Queen Draga, 1903), house of Parliament (unfinished), univ. national museum and library; tobacco, woolen, chocolate factories, etc. It belonged at various times to Roman and Byzantine empires; was seized by Turks (1521), by Austrians (1718), and finally transferred to Serbians (1867). During the World War suffered much damage by bombardment. When the Austrians launched offensive in Nov. 1914, Belgrade was evacuated by the Serbs, but was held by Austrians only for thirteen days. Brit. naval mission with armed launches on the Danube kept Austrian monitors in check. In autumn of 1915 Austrians renewed offensive, and on Oct. 7 Germans crossed river, and after fierce fighting drove out the Serbs (Oct. 9). The city remained in enemy's possession until Nov. 1, 1918, when the Serbian flag again flew over Belgrade. Pop. 120,000.

BELGRANO, MANUEL (1770-1821), Argentine patriot and statesman, played a leading part in Argentina's struggle for freedom from Span. rule; became one of directors of new republic of Argentina; of broad and enlightened views; gave great encouragement to all branches of science and learning.

BELIAL, epithet of Satan in Bible; hence Satan or an evil person.

BELIAPATAM, or VALARPATTARAM, town, Malabar dist., Madras Presidency, India (11° 56' N., 75° 20' E.), on l. bk. of Bellapatam R., 4 m.

from Cannanore (Kannur); timber.

BELISARIUS (c. 505-65), general of Byzantine empire; put down *Nika* revolt at Constantinople, 532; won famous victories against Vandals and Ostrogoths of Africa and Italy; d. in disgrace.

BELIZE, BALIZE (17° 29' N., 88° 11' W.), town, Brit. Honduras. Pop. 10,500.

BELL, hollow metal vessel, provided with clapper, by which it is sounded. B's are composed of a mixture of copper and tin (4 to 1), and are cast in the following manner: First an inner core of brickwork is formed, the outside of which is liberally smeared with grease, and upon this structure is moulded a clay model of the intended b. Upon the outside of this clay b. the inscriptions (if any) are moulded in wax, these in their turn being smeared with grease, and then two separate layers of clay are carefully moulded around the inner structure. The entire mass is then baked to the required degree of hardness, during which time the wax and other grease escapes through holes left for that purpose. After this the clay b. is knocked away, and into the space thus left between the outer cope and the original core the necessary amount of molten metal is poured, and the b., when cooled, is complete.

BELL, ALEXANDER GRAHAM (1847-1922), American scientist and inventor; s. of Alexander Melville and Eliza G. Bell. Educated in Edinburgh and at London University. Given honorary degrees of Ph.D. by Warzburg College in 1882; M.D. by Heidelberg in 1886; LL.D. by Harvard in 1896; and same by Amherst, St. Andrew's Edinburgh and George Washington. Went to Canada from Scotland in 1870 and to Boston in 1871. In this year became professor of vocal physiology in Boston University. Invented telephone, the patent of which was dated March 17, 1876. Other inventions include the photo-phone induction balance and telephone probe for painless detection of foreign matter in the human body. For this was given the above honorary degree of M.D. by Heidelberg. With Sumner Tainter and C. A. Bell, invented and perfected the graphophone in 1883. He also made many improvements in tetrahedral kites and in aerial locomotion for the Aerial Experiment Association, from 1903 to 1906. In 1887 he founded and endowed the Volta Bureau for increase of knowledge relating to the deaf. Founder and ex-president American Association to Promote Teaching of Speech to the Deaf. Fellow or member of many of the

scientific societies of America, Great Britain and Europe. Was awarded the Volta Prize medal by France, Royal Albert Medal by Great Britain, Elliott Cresson Medal, John Fritz Medal, Hughes Medal, Edison Medal, Medal of Royal Society of Art, Officer French Legion of Honor. These and other numerous tokens of scientific attainment attested the world's appreciation of the great boon to mankind that Alexander Graham Bell had made when he invented and perfected the telephone. In 1904 he had brought to Washington the remains of James Smithson, the founder of America's great seat of scientific research, the Smithsonian Institution.

BELL, ALEXANDER MELVILLE (1819-1905), Amer. educationist; b. Edinburgh, Scotland; lectured on Elocution at univ's of Edinburgh and London; became lecturer on philology at Kingston (Ontario) and Washington, D. C., successively.

BELL, ANDREW (1753-1832), Scot. clergyman and educationist; b. St. Andrews; went to Madras as army chaplain (1787), and two years later was app. head of the Male Orphan Asylum there, where he introduced the system of education by pupil teachers. Upon his return to England the 'Madras system' was adopted by others, and soon became popular; given prebend of Westminster; buried in the Abbey.

BELL, SIR CHARLES (1774-1842), Scot. anatomist and surgeon; bro. of John B., anatomist, and George B., jurist; practiced in London; prof. of surgery in Edinburgh; gained international fame owing to his discovery of existence of distinct sensory and motor nerves; author of several works on anat. and surgery.

BELL, GEORGE, JR. (1859), s. of George and Isabelle Bell. Graduated at United States Military Academy at West Point in 1880. LL.B. Cornell University College of Law, 1894. Commissioned 2nd Lieutenant of Infantry, June 12, 1880; 1st lieutenant, 1886; captain 1898; major, 1903; lieutenant-col., 1911; colonel, 1913; and brigadier-general on July 17, 1914. Major-general in National Army, August 5, 1917, and in Regular Army March 22, 1921. Took part in Spanish-American War. Saw service in Philippines and active in putting down insurrection. Commanded 33rd Division in A.E.F. during World War. Given British Order of St. Michael and St. George; French Legion of Honor and Croix de Guerre.

BELL, GEORGE JOSEPH (1770-1843), Scot. jurist; author of *Law of*

Bankruptcy (1804), *Commentaries on Law of Scotland* (1826), and other legal works.

BELL, HENRY (1767-1830), Scot. engineer; built first Brit. steamboat, the Comet (1812).

BELL, HENRY GLASSFORD (1803-74), Scot. advocate and author; editor of *Edinburgh Literary Journal* (1828).

BELL, SIR ISAAC LOWTHIAN (1816-1904), Eng. metallurgist and iron manufacturer; was highest authority of his time on chemical metallurgy, the blast furnace, and the general science of iron and steel manufacture; M.P. for the Hartlepoons; created baronet (1885). His s. Hugh (1844) is a strong advocate of Free Trade, and an authority on economic questions.

BELL, JAMES FRANKLIN (1856-1919), s. of John W. and Sarah Venable Bell. Graduated at United States Military Academy at West Point in 1878; Commissioned 2nd lieutenant June 28, 1878; 1st lieutenant, Dec. 29, 1890, captain, 1898; major, U.S.V., 1898; colonel 36th Infantry U.S.V., 1899; brigadier-general U.S.V., 1899; brigadier-general in U.S. Regular Army, Feb. 19, 1901; major-general, Jan. 3, 1907. Served on the Western Plains with 7th U.S. Cavalry from 1878 to 1894. In Sioux campaign, Pine Ridge, S. D., in 1891; aide to Gen. J. W. Forsyth on Pacific Coast. Awarded Congressional Medal of Honor, Nov. 27, 1899, for most distinguished gallantry in action Sept. 9, 1899, near Para, Luzon, Philippine Islands. Chief of Staff, U.S. Army, 1906 to 1910. Commanded 77th Division Sept. 1917.

BELL, JOHN (1796-1869), Amer. politician; foremost opponent of secession of Southern states, 1860; gave his name to Southern Constitutional party.

BELL, JOHN (1691-1780), Scot. physician and traveler; traveled extensively in Russia, Turkey, and Asia with Russ. embassies; physician to Peter the Great on expedition to Caspian Gates.

BELL, JOHN (1763-1820), Scot. surgeon and anatomist; was lecturer on anat. in Surgeon's Hall, Edinburgh (1790), and practiced as surgeon.

BELL, JOSEPH (1837-1912), Scot. surgeon; editor (1873-96) *Edinburgh Medical Journal*; surgeon and teacher of surgery, Royal Infirmary, Edinburgh; the original of 'Sherlock Holmes,' whose methods were based on B.'s methods of diagnosis.

BELL, ROBERT (1800-67), Irish

author; pub. annotated edition of the *English Poets*, with memoirs (24 vols., 1854-57), completed Southey's *Lives of the British Admirals*, and was associated with various other works.

BELL, ACTON, CURRER, AND ELLIS, see **BRONTE**.

BELL, BOOK, AND CANDLE, objects which figure in papal excommunication; sentence closes with words, 'shut the book, extinguish the candle, ring the bell.'

BELL, LIBERTY, which is supposed to have been rung to announce the signing of the Declaration of Independence, in Philadelphia, on July 4, 1776, but as a fact was not rung till several days later, when the document was publicly read. It was brought to Philadelphia from England for the Colonial Assembly Hall in 1752, but being injured in landing, was recast twice, in the following year, when there was engraved on it the inscription 'Proclaim liberty throughout all the land and the inhabitants thereof' (Lev. xxx. 10). When the British occupied Philadelphia in 1777, they dumped the bell into the Delaware River, but it was recovered after they left the city. Every year it was rung on July 4th, until 1835 when, on July 8th, while being tolled for the funeral of Chief Justice Marshall, it cracked. Since then it has hung in the hallway of Independence Hall, Philadelphia, as a historic relic.

BELL (or INCHCAPE) ROCK (56° 28' N., 2° 23' W.), reef surmounted by a lighthouse in German Ocean, off coast of Forfarshire, 11¾ miles S.E. of Arbroath. The name refers to an old tradition made popular in Southey's ballad, *The Inchcape Rock*.

BELLADONNA, DEADLY NIGHT-SHADE, plant, *Atropa belladonna*, of natural order *Solanaceae*, the leaves and roots of which are used as a drug in med. because of the alkaloids contained, *atropine* being the most important.

BELLAMY, EDWARD (1850-98), Amer. author; ed. for bar, but became a journalist; famous as the author of *Looking Backward, 2000-1887* (1888).

BELLAMY, GEORGE ANNE (1727-88), Eng. actress; natural dau. of Lord Tyrawley, ambassador at Lisbon; adopted the stage, and was associated with many of Garrick's triumphs at Drury Lane; pub. an *Apology* in 6 vols. (1785) for her irregular life.

BELLAMY, JOSEPH (1719-90), Amer. theologian; Congregational pas-

tor at Bethlehem, Connecticut; popular preacher with powerful influence on religious thought of time.

BELLARMINE, ROBERT FRANCIS ROMULUS (1542-1621), Ital. cardinal; b. Monte Pulciano; entered Society of Jesus (1560); made cardinal (1599); abp. of Capua (1601), but resigned, 1605; became later abp. of his native town; led life of strict asceticism.

BELLARY, BALLARI (15° 8' N., 76° 50' E.), town, Madras, India; upper fort, on high rock, used as prison; lower fort has barracks; trades in cotton. Pop. 58,000. District produces cotton, cereals. Pop. 950,000.

BELLAY, GUILLAUME DU, SIEUR DE LANGEY (1491-1543), Fr. diplomatist; served Francis I. of France; also historian of merit; sympathized with the Reformers; friend of Rabelais. Bellay, Jean du (c. 1493-1560), younger bro. of Guillaume, diplomatist; cr. cardinal, 1535; bp. of Ostia; dean of Sacrd Coll., 1555; of liberal views; wrote Latin verse.

BELLAY, JOACHIM DU (1522-60), Fr. poet and critic; formed a close friendship with Ronsard, and through him became associated with other poets in founding the Pléiade (see **RONSAARD**). His critical writings are of high quality (e.g. *Defense et Illustration de la Langue françoise*), and in poetry he ranks next to Ronsard. Hilaire Belloc, *Avril*.

BELL-BIRD, popular name of various kinds of birds which have bell-like note, such as Australian *Manorhina*, New Zealand Honey-Sucker, *Anthornis*, S. Amer. Chatterer—*Chasmorhynchus*.

BELLE-ALLIANCE, LA, farm on field of Waterloo.

BELLEAU WOOD, or the **BOIS DE LA BRIGADE DE MARINE**, a wooded height to the northwest of Chateau-Thierry, France, made notable in the World War by the protracted fighting waged for its possession between American and German forces in the summer of 1918. The U.S. Marines were engaged in the struggle, and in honor of their brilliant achievements the wood was renamed by the French as above. The fighting was part of American resistance to the continued advance of the Germans, who had reached Chateau-Thierry and the Marne, and had been forced back from that region. On the north of the town named Belleau Wood presented a serious obstacle to the pursuing American forces, as it was strongly occupied by the Germans. In their advance the Americans had been unable to take this little forested stronghold perched on a hill among rocks, and had

swept past it, after capturing a nearby elevation. The wood concealed ambushes of German infantry and machine guns, which were a thorn in the side of the Americans on the outskirts. They made several raids into the wood, expelling groups of Germans here and there, but the next day the enemy would reappear and pour a harassing fire on the American lines. The fighting began on June 8 by a German attack to oust the Americans from positions they held on the borders of the wood. A counter assault followed with systematic deluge of shells that lasted for two days. By June 13 the subsequent attack in force, undertaken by the Marines, resulted in the capture of the last of the German positions in the wood and the capture of some 300 prisoners and many machine guns and trench mortars. The Germans then became a menace on the borders of the wood, where groups of them impinged on a number of awkward pockets or little salients, and kept the Americans in the wood engaged in continuous skirmishes. By June 23 they had been expelled from all the positions they held on the wood's borders except a single point on the north. This was finally taken after a scathing American fire lasting thirteen hours.

BELLEFONTAINE, a village of Ohio, the county seat of Logan Co. It is on the Cleveland, Cincinnati, Chicago and St. Louis, and the Toledo and Ohio Central railroads, 57 miles northeast of Dayton. The city occupies the highest elevation in the State and is the center of an important agricultural region. Its industries include car shops and many manufacturing plants. There are banks and daily and weekly newspapers. Pop. 1920, 9,336.

BELLE ISLE, STRAITS OF (51° 30' N., 57° W.), channel separating Labrador from Newfoundland; midway lies island of B. II.

BELLE-ILE-EN-MER (47° 20' N., 3° 10' W.), island, west Fr. coast. Pop. 10,000.

BELLE-ISLE, CHARLES LOUIS AUGUSTE FOUQUET, DUC DE (1684-1761), Fr. general and diplomatist; distinguished himself in wars of Spain and Polish successions; made marshal of France, 1741; cr. duke and peer of France, 1748.

BELLEROPHON (classical myth.), s. of Poseidon; famous for slaying monster, Chimaera, which he attacked upon his winged horse, Pegasus.

BELLES-LETTRES (Fr.), the literature of art as opposed to the literature

of science; used generally of literary writing; term first employed in England during first decade of XVIII. cent.

BELLEVILLE, a city of Illinois, the county seat of St. Clair co. It is 14 miles east of St. Louis, Mo., and is on several important railroads. The city is the center of an important coal mining region. It has an extensive trade in flour and general produce. Its industries include the manufacture of glass, stoves, flour, machinery, etc. It is connected with St. Louis by trolley. There is a public library, a cathedral, convent, bank, etc. Pop. 1920, 24,823.

BELLEVILLE, a city of New Jersey in Essex co. It is on the Passaic River and on the Erie Railroad. It is a suburb of Newark with which it is connected by electric railway. Its industries include the manufacture of rubber, dynamos, brass, copper, etc. The city has a public library, and an Elks' home. Pop. 1920, 15,660.

BELLEVUE, a city of Kentucky, in Campbell co. It is on the Chesapeake and Ohio railroad and has important industries including the quarrying of sand and gravel. Pop. 1920, 7,379.

BELLEVUE, a city of Ohio in Huron and Sandusky counties. It is on the Pennsylvania, the Lake Shore and other important railroads, and is the center of an important agricultural region. There are quarries of limestone, lumberyards, and other important industries. The city has a library and a hospital. Pop. 1920, 5,776.

BELLEVUE, a borough of Pennsylvania, in Allegheny co. It is on the Pittsburgh, Fort Wayne and Chicago railroad and the Ohio river. It is a suburb of Pittsburgh. The borough has a hospital and a memorial park. Pop. 1920, 8,198.

BELLEW, HAROLD KYRLE (1857-1911), Eng. actor and playwright, associated with Mrs. Brown Potter; wrote *Hero and Leander*, *Yvonne* and *Iolande*, etc.

BELLIGERENCY, state of carrying on war under conditions of international law.

BELLIGERENT, a government or an insurgent section of a country at war. The term is applied to contending nations or powerful factions thereof as a recognition of their belligerency by neutral powers, and the granting to them of the rights and status of countries in armed conflict. In international law the question of according belligerent rights to one or other or both of the

combatants turns on the existence of a stable, organized civil government behind the forces at war, exercising its authority over a definite territory. In the case of war between sovereign powers, their rights and duties, both as related to their own hostile acts and to neutral nations, are generally clear. The recognition of their belligerency becomes an official formality upon a notification to other powers by such governments that they are in a state of war. It is known as a proclamation of neutrality. The recognition involves an obedience by belligerents to the rules of modern warfare, protecting the lives and property of non-combatants, forbidding cruelty, and minimizing destruction as much as possible in the pursuit of victory. In the World War it was Germany's violation of her obligations as a recognized belligerent that brought the United States into conflict. Where a condition of civil war arises in a country by the development of power insurgent forces within it, challenging the authority of the existing government, the success of the so-called rebels carries with it a recognition of their government as a sovereign power. Even where a rebellion is not successful, its leaders may obtain the rights of belligerents, especially when the conflict has far-reaching effects and threatens the interests of neutral states. Thus in the Civil War the belligerency of the Southern Confederacy was recognized by Great Britain and France. Such international recognition gives moral support to a cause. Its flag acquires a national status, and the insurrectionists gain the right to negotiate loans abroad, but they also must bear the responsibility of any damage caused to the citizens or commerce of neutral states.

BELLINGHAM, a city of Washington, the county seat of Whatcom co. It is on the Great Northern, the Northern Pacific and other railroads, and is 100 miles north of Seattle. An important naval station is situated here. Its public institutions include the State Normal School, high schools, libraries and hospitals. The lumbering and salmon-canning are important industries as are also the dairy, egg and poultry industries. Bellingham is a port of entry for ships of the Oriental and Pacific coast trade. Pop. 1920, 25,570; 1924 (est.), 33,000.

BELLINI, GIOVANNI (1430 - 1516), Ital. artist; s. of Jacopo B. (c. 1400-70), and younger bro. of Gentile B. (c. 1430-1507), all distinguished artists, and founders of the great XV.-cent. Venetian school. The f. who was s. of a pewterer, became pupil of Pisanello and Fabrizio, and one of the most successful portrait-

ists of his age. Gentile, who, together with Giovanni, had assisted the elder B. in some larger works for public buildings, early established wide reputation for his individual work. He spent some considerable time in Constantinople at the invitation of Muhammad II., whose portrait he painted. Examples of his work are to be seen in the Louvre and the National Gallery, London; much of his work done for Venetian buildings was unfortunately destroyed by fire in 1577.

BELLINI, VINCENZO (1801 - 35), Sicilian composer; b. Catania; studied at Naples; first operas, *Adelson e Savina* (1825) and *Bianca e Fernando* (1826), were both produced at Naples; *Il Pirata* (1827), produced at Milan, was his first distinct success, and was followed by his masterpieces, *I Montecchi e Capuleti* (1830); *La Sonnambula* (1831); *Norma* (1831), and *I Puritani* (1835).

BELLINZONA (46° 11' N., 9° 1' E.), town, Ticino, Switzerland, on St. Gotthard railway; formerly fortified; three castles. Pop. 10,400.

BELLITE, explosive used in mining, a mixture of ammonium nitrate and dinitrobenzene, the latter in proportion of 16 per cent., or 7 per cent., according to purpose in view.

BELLMAN, KARL MIKAEL (1740-95), Swed. poet; famous for songs and odes; pub. *Fredmans Epistlar* (1790); *Fredmans Sanger* (1791); *Bacchi Tempel, Zion's Hogtid*, etc.

BELLO, ANDRES (1781-1865), Venezuelan poet and scholar.

BELLO-HORIZONTE (20° 1' S., 44° 17' W.), city, Brazil. Pop. c. 25,000.

BELLOC, HILAIRE (1870), of Fr. descent, Eng. author of poems, satirical novels, books of travel, etc.; keen student of military matters, he prophesied that the Germans would invade by way of Belgium; most popular work, *The Path to Rome*. He visited the United States in 1923.

BELLONA (classical myth.); goddess of war; war personified.

BELLOT, JOSEPH RENÉ (1828-53), Fr. sailor; joined Franklin search expeditions (1851-52), and discovered 'Bellot' Strait (72° N., 94° 40' W.), in Brit. N. America.

BELLOWS, GEORGE WESLEY (1882), artist, was born in Columbus, O. He was educated at Ohio State University, and later studied under Robert Henri. He has exhibited at the International Exhibition, Venice; the Royal Academy, Berlin; Royal Society, Mu-

BELLOWS

nich; International Exhibition, Rome; and the Kensington Museum, London, as well as in the chief cities of the United States. He is also represented in the collections of the Metropolitan Museum, New York; the Pennsylvania Academy, Philadelphia, and in the Toledo Museum of Art. In 1908 he won the second Hallgarten prize, and has since received various other prizes and medals, including the Maynard Prize, N.A.D.

BELLOWS, HENRY WHITNEY (1814-82), Unitarian divine; popular preacher and writer; minister in New York, 1839-82.

BELLUNO (46° 8' N., 12° 14' E.), town and province, N. Italy; cathedral; silk. Pop. 20,500.

BELMONT, AUGUST (1816-1890), American banker, was born at Alzey in Germany and educated at Frankfort. He was later apprenticed to the banking house of Rothschild. In 1837 he was sent to Havana on business for the firm, and from there sent to New York, where he established himself in the banking business as New York representative of the Rothschilds. He was later Consul-General of Austria and afterwards Chargé d'Affaires at The Hague, and subsequently Minister-Resident. In 1860 he was delegate to the Democratic National Convention and later became chairman of the Democratic National Committee, which office he held until 1872.

BELMONT, AUGUST (1853), banker, was born in New York, the son of August Belmont. He was educated at Harvard University, later entering his father's banking business. On the death of the elder Belmont he became the head of the firm, continuing to act as the representative of the European banking firm of Rothschilds. The firm has steadily continued to exert wide influence on the financial and railroad affairs of the United States, an influence which first made itself felt under the elder Belmont's direction. In 1900 he organized the Rapid Transit Subway Construction Company for the purpose of supporting John B. McDonald, who had received a \$35,000,000 contract for constructing a rapid transit system in New York. In 1905 he was elected president of the National Civic Federation and re-elected the following year. He was also appointed treasurer of the Democratic National Committee, and has been chairman of the board of directors of the Interboro Consolidated Corporation, International Rapid Transit Company and the Rapid Transit Subway Construction Company.

BELOW

BELMONT, ELEANOR ROBSON (Mrs. August Belmont), was born in Wigan, Lancashire, England, the daughter of Charles Robson. She was educated at St. Peter's Island, S.I., N.Y., and made her first appearance on the stage in 1897 at the California Theatre. For two years she played in stock companies in San Francisco, Denver and other cities and had much success in *Arizona*, and as Constance in *In a Balcony*, Mlle. de la Vire in *A Gentleman of France* and Audrey in the play of that name. In 1903 she played Juliet to the Romeo of Kyrle Bellew, shortly after starring in Zangwill's play, *Merely Mary Ann*. Her greatest success, however, was scored in Frances Hodgson Burnett's *The Dawn of a Tomorrow*, which she played from 1908 to 1910. In 1910 she married August Belmont, the American banker, and retired from the stage.

BELMONT, PERRY (1851), American financier, was born in New York City, the son of August Belmont. He was educated at Harvard and studied civil law at the University of Berlin. He was admitted to the bar in 1876 and was a member of the 47th to 50th Congresses, and from 1885 to 1889 held the post of chairman of the Committee on Foreign Affairs. He has been Envoy Extraordinary and Minister Plenipotentiary to Spain and on five occasions has been a delegate to the Democratic National Convention. In 1917 he was commissioned captain of the U.S. Reserve, and is a member of the advisory board of the American Defense Society.

BELOIT, a city of Wisconsin, in Rock County. It is on the Rock river, and the Chicago, Northwestern and the Chicago, Milwaukee and St. Paul railroads, 85 miles S.W. of Milwaukee. The city has excellent water power and its industries include a large woodworking plant, the manufacture of gas engines, wind mills, iron, paper mill machinery, etc. It is the seat of Beloit College. Pop. 1920, 21,284.

BELOIT COLLEGE, in Beloit, Wis., a co-educational, non-sectarian institution, established in 1846, with a faculty of about 40 and a student enrollment of about 400. Its buildings are valued at \$600,000 and its income annually amounts to about \$95,000.

BELOW, FRITZ VON (1853), German soldier; commanded German 1st Army on Somme front (1916); drew up *Manuel for the Training of Infantry in War*, which, Ludendorff says, 'showed a thorough grasp of the character of our infantry' on Arras front, April 1917; failed in great attack on Reims (1918).

BELOW, OTTO VON, Ger. soldier, the brother of Fritz von Below, led his troops so brilliantly at the battle of Tannenberg, E. Prussia (1914), that, although a junior corps commander, he was given command of the 8th Army on the Baltic flank; was sent to Macedonia to take command of new army group operating with the Bulgarians (1916); succeeded Falkenhause in command of 6th Army at Lens (1917); sent to Italy, and broke the Ital. lines at Caporetto; his successful employment of 'infiltration tactics' marked him out for a command in the great offensive in the West, where he led the 17th Army that failed to take Arras (March 1918).

BELSHAZZAR (VI. cent. B. C.), Babylonian general, identified by modern scholars as s. of King Nabonidos, not of King Nebuchadrezzar, as stated in *Book of Daniel*; made last resistance of Babylonia to Cyrus; Bible story of B.'s feast is thought apocryphal.

BELT, GREAT (55° 30' N., 10° 50' E.), strait, Denmark, between Zealand and Fünen.

BELT, LITTLE (55° 12' N., 9° 53' E.), strait, Denmark, between Fünen and Jutland.

BELTANE, Celtic festival associated with May-Day, supposed to be derived from the Druidical worship of the sun-god. Mention is made of it as early as the beginning of X. cent. by Cormac, abp. of Cashel. It was the custom to light 'beltane fires,' at which 'beltane cakes' were baked, and certain usages were observed in the distribution of these cakes amongst the company.

BELTRAMI, GIULIO CESARE, (1779-1855), Ital. patriot, explorer, and author; discovered sources of Mississippi.

BELUCHISTAN. See **BALUCHISTAN**.

BELUGA, WHITE WHALE (*Delphinapterus leucas*), Arctic Delphinid cetacean.

BELVIDERE ('beautiful view'), Ital. building with fine view; the b. formerly part of Vatican, Rome, gave name to *Apollo B*.

BELVIDERE, a city of Illinois, the county seat of Boone co. It is on the Kishwaukee River and on the Chicago and Northwestern railroad. It is the center of an important agricultural region and its industries include the manufacture of sewing machines, safety razors, bicycles, automobiles, etc. Its public buildings include a park, library and an opera house. Pop. 1920, 7,760.

BELZONI, GIOVANNI BATTISTA

(1778-1823), Ital. traveler, engineer, antiquarian; went to Egypt, 1815, to construct a hydraulic machine for Mehemet Ali; later studied Egyptian antiquities, opened second pyramid of Gizeh, and searched for the ruins of the temple of Jupiter Ammon. Many of the antiquities found by him are in the British Museum; pub. *Excavations in Egypt and Nubia* (1821); d. during a journey to Timbuktu.

BEM, JOSEPH (1795-1850), Polish soldier; as leader of the Hungarian insurgents won many victories over Austrians; later entered Turk. service, embraced Islamism, and performed brilliant services in suppressing Arab insurrections.

BEMBO, PIETRO (1470-1547), Ital. cardinal; b. Venice; app. historiographer at Venice (1529), and afterwards librarian of St. Mark's; secured a cardinal's hat from Paul III. (1539). He was famous for his learning, and became one of the most elegant writers of the Tuscan school.

BEMIDJI, a city of Minnesota, the county seat of Beltrami co. It is on the Great Northern and other railroads. Its beautiful situation on a lake makes it a popular summer resort. Its public institutions include the State Normal School, Federal buildings and a public library. Its chief industry is lumbering. Pop. 1920, 7,086.

BEMIS, EDWARD WEBSTER (1860), Amer. economist; wrote *Municipal Monopolies*; has held professorial appointments.

BEN.—(1) In Scot. two-roomed cottage ('a but and a ben') the kitchen, or outer room, is known as the *but*, the inner chamber, opening from the kitchen, the *ben*. (2) Gaelic for mountain, (e.g.) Ben Nevis. (3) Arab and Hebr. for s. of, (e.g.) Rabbi ben Ezra, Ben-jamin.

BENAR.—(1) Part of Lieutenant-governorship of Behar and Orissa, Bengal, India; 'Garden of India' in N.; cereals, indigo; subject to famine; at Monghyr is one of largest cigarette factories in world. Area, 42,361 sq. m.; pop. 23,753,000. (2) Chief tn. of above (25° 11' N., 85° 31' E.), silk, cotton, muslin goods, Buddhist, Brahmanical, and Mohammedan ruins. Pop. 35,200.

BENARES (25° 19' N., 82° 56' E.). (1) city, United Provinces, India, on Ganges; labyrinth of narrow streets; many temples, mosques, shrines, palaces; notable buildings are Mosque of Aungzeb and Golden Temple and old Observatory. From remotest ages B. has been

Hindu Holy City, and center of Brahminical learning; annually visited by innumerable pilgrims who come to bathe in sacred river; commercial center; manufactures brocade, gold filigree, silver and brass work. Pop. 205,000. Pop. of district, 882,084; of division, 5,069,020. (2) native state; cr. 1911; area, 887 sq. miles. Pop. 362,000.

BENBECULA (57° 26' N., 7° 18' W.), island and strait, Hebrides, Scotland.

BENBOW, JOHN (1653-1702), Eng. vice-admiral; s. of a Shrewsbury tanner; rose in Navy to highest rank. William III. had immense faith in 'honest B.,' and sent him in 1701 as commander-in-chief to the West Indies. On Aug. 19, 1702, when cruising off Santa Marta, he gave chase in flagship *Breda* to Fr. squadron under Du Casse.

BENCH, word used to signify legal or political body, as King's B. (or Queen's B. when queen is reigning), Treasury B., etc.; 'board' has received similar transference of meaning.

BENCHLEY, ROBERT CHARLES (1889), writer, was born at Worcester, Mass. and educated at Harvard. For two years he worked in the Curtis Publishing Co., in Philadelphia and in 1916 became associate editor of the N.Y. Tribune Sunday Magazine, the following year being appointed editor of the New York Tribune Graphic. During the war he was secretary to the Aircraft Board in Washington and in 1919 was made managing editor of Vanity Fair. He was responsible for the column 'Books and Other Things' during 1920-21 in the New York World and is the author of *Of All Things*.

BENCOOLEN, BENKULEN (3° 50' S., 102° 25' E.), district, Sumatra. Pop. c. 205,000.

BEND, curvature in a road or river; nautical term, meaning to attach, such as 'bending' a cable on to an anchor; in heraldry, a band crossing the shield diagonally from right to left; when drawn in the opposite direction it is termed a 'bend sinister.' A diminution of this latter mark constitutes a 'baton sinister,' the sign of illegitimacy.

BENDA, WLADYSLAW THEODOR (1873), illustrator and painter, was born in Poznon, Poland, the son of Jan S. Benda, a pianist and composer. He was educated at the School of Technology and Academy of Art in Cracow and later at art schools in Vienna, San Francisco and New York. He came to the United States in 1899 and was naturalized in 1911. He has made numerous illustrations for the Century,

Scribner's, Cosmopolitan McClure's, magazines, etc., and has also won considerable success as a decorative painter.

BENDER, BENDERY (46° 47' N.; 29° 32' E.), town, Bessarabia, Russia; Charles XII. besieged B. after *Pultowa* (q.v.); brick-kilns. Pop. 33,700.

BENDIGO (36° 45' S., 144° 18' E.); town, Victoria, Australia. Pop. 45,000.

BENDIN (50° 19' N., 19° 14' E.); town, Poland. Pop. 50,000.

BENEDEK, LUDWIG VON (1804-81), Austrian general; won distinction in suppressing the revolt in Galicia (1846), afterwards performing brilliant service in various battles in Italy and Hungary (1849-59); gov. of Hungary (1860); commander-in-chief at Venice (1861); suffered a crushing defeat by the Prussians at *Sadowa*, 1866.

BENEDETTI, VINCENT, COUNT (1817-1900), Fr. diplomatist; ambassador at Berlin during last years of Second Empire, and was concerned in the declaration of war against Prussia (1870); pub. *Ma Mission en Prusse* (1871), *Essais Diplomatiques* (1895-97), both of which bear upon Bismarck's diplomacy.

BENEDICITE, first word of Latin version of the *Canticle of the Three Children* (Apocrypha), and of the Latin Grace used in R.C. institutions, which it is accordingly used to describe.

BENEDICT, name of fifteen popes. Of the first nine popes and one anti-pope (B.X., 1058) little of importance is known, save that one (B. II., 684) was noted for holiness of life, and is reputed a saint, and one for dissoluteness of life (B. IX., 1032). He was driven out of Rome, and resigned the Papacy several times, and at length retired to a monastery. B. XI. (1303-4), Nicholas Boccasini, a Dominican; wrote scriptural commentaries; is beatified. B. XII. (1334-42), Jacques Fournier, a Cistercian; an able theologian; wished to restore Papacy to Rome, and tried to unite the Gk. and Lat. Churches. B. XIII. (1724-30), Pietro Orsini, became a Dominican in spite of family opposition; made cardinal at 23; made pope against his will; ruled with piety and vigor. B. XIV. (1740-58), Prospero Lambertini, an able theologian and canonist, left work on canonization, which is still authoritative.

The anti-pope Pedro di Luna was known as B. XIII.

BENEDICT XV. (GIACOMO DELLA CHIESA) (1854-1922), a Pope b. in Genoa, Italy. He was descended from

an old noble family. His education was obtained at the University of Genoa, from which he took his degree in Philosophy, in 1875, after which he entered the Collegio Capranica, a school for the training of those aiming to achieve higher ranks of the Catholic priesthood. Here he specialized in the diplomatic course, his desire being to enter the diplomatic service of the Vatican. Very early in his career he made the friendship of Cardinal Rampolla, and when the latter was sent to Madrid, as Papal Nuncio, in 1883, the youthful Della Chiesa accompanied him as his private secretary. In Madrid he remained for four years, returning with his master when he was recalled, after which he became a secretarial official in the Holy See, having special charge of the diplomatic correspondence and the archives. In 1907 he was appointed Archbishop of Bologna, and in 1914, he was raised to rank of Cardinal. On Sept. 3, 1914, he was elected, after the ballots had been cast, to succeed Pope Pius X., the vote being almost unanimous. As the Pope of the period of the World War, he deserves special mention for the many and almost continuous efforts he initiated to bring about peace.

BENEDICT BISCOP (d. 690). Eng. abbot; founded monastery at Jarrow; teacher of Bede.

BENEDICT, SIR JULIUS (1804-85), musical composer; b. Stuttgart; settled in London, 1835; associated with grand opera at Drury Lane and other theatres. His own operas include *The Lily of Kilarnay*, *The Crusaders*, *The Bride of Venice*, etc.; and he composed besides numerous oratorios, cantatas, and operettas; knighted, 1871.

BENEDICTINE, liquor prepared at Fécamp, France.

BENEDICTINES ('Black Monks'), so called after St. Benedictine of Nursia, who established monasteries at Subiaco, Monte Cassino (famous in annals of monasticism), and, before his death, twelve other places. When Monte Cassino was taken by the Lombards (c. 590) the monks migrated to Rome. To this Order belonged St. Augustine, who evangelized England; offshoots were planted in Gaul and Germany; and by the VIII. cent. St. Benedict's was the chief monastic rule in Europe. B's, besides Christianizing England and Slavonic and Scandinavian peoples, did much educational work; they had many schools in the Middle Ages, as they have today. In the IX. cent. their great monastery of Cluny (France) became of enormous importance in Europe, and lesser houses were subordinated to it.

BENEDICTION (Lat. *benedictio*; blessing), ecclesiastical term for the blessing either of persons or of things. Among Protestants it is generally limited to the b. of the congregation by the minister at the close of the service, but among Catholics it is much more widely used. All sorts of things, water or oil used in worship, and places or buildings for purely secular use, receive b. Catholics b. is sacramental and believed to guard especially against evil spirits.

BENEDICTUS (d. 1994), abbot of Peterborough (1177-94); caused *Gesta Henrici Regis Secundi* to be copied; wrote two works on Becket.

BENEDICTUS, Lat. name for hymn of Zacharias in Luke 1:68.

BENEFICE (Lat. *beneficium*, benefit) — (1) estate granted for life under Roman Empire and in early Middle Ages. (2) estate granted to clergy, settle on themselves and successors. The patron of the b., (i.e.) the donor of the estate or purchaser of the advowson, presents a clerk to the bp., who institutes him to his office; or if the bp. is patron he collates a clerk of his own choice to the b.

BENEFIT OF CLERGY, the privilege of virtual immunity for clerical offenders, at one time a scandal. Those in orders, even in minor orders, were entitled to have their case removed to eccles. courts, and often escaped full punishment which would be meted out to a layman.

BENEKE, FRIEDRICH EDUARD (1798-1854), Ger. philosopher; his views were strongly opposed to those of Hegel and Kant; he held that empirical psychology forms the basis of all philosophy, and that mental phenomena are to be treated by generic methods. He was prof. of Philosophy at Berlin for 1832; pub. *Erkenntnislehre* (1820), *Lehrbuch der Psychologie als Naturwissenschaft* (1833).

BENÉT, STEPHEN VINCENT (1898), writer, b. at Bethlehem, Pa.; bro. of William Rose Benet (q.v.). He was educated at Yale, where he was the winner of the 1st John Masefield poetry prize, the 1st Albert Stanburrough Cook prize and the 3rd Ten Eyck prize. His published works include *Five Men and Pompey*, *Young Adventurers*, *Heavens and Earth* and *The Beginning of Wisdom*.

BENÉT, WILLIAM ROSE (1886), author and poet, was b. at Fort Hamilton, New York harbor. He was educated at Albany Academy and Sheffield Scientific School. For some years he was a free lance in California, contributing chiefly poetry to the magazines. Later he became a reader for the Century

Magazine and has been assistant editor of that magazine since 1914. During the World War he was in the U.S. Air Service, in 1919 joining the Corman Co. advertising service. Since 1920 he has been associate editor of the New York Evening Post Literary Review. He was author of *Merchants from Cathay*, *The Falconer of God*, and in collaboration with his wife is the translator of Claudel's *The East I Know*.

BENEVENTO (41° 7' N., 14° 45' E.), town (and province), Italy; abp.'s see; part of papal domain, 1053; conquered by French, 1798; restored to Pope, 1815; united with Italy, 1860; magnificent triumphal arch of Trajan, built 114; is a gate of city. Pop. 24,300.

BENEVOLENCE, name given to forced loan levied by Eng. crown without consent of Parliament; against provision of Magna Carta, and declared illegal by Petition of Right, 1629, and Bill of Right, 1689.

BENGAL (23° N., 89° E.), Presidency of 'Fort William in Bengal,' created a governorship (1912); includes deltas of Ganges and Brahmaputra and alluvial plains along their courses; bounded N. by Sikkim, Bhutan, E. by Assam, Upper Burma, W. by Bihar and Orissa, S. by Bay of Bengal. Bengal came into hands of E. India Co. (1765); transferred to Brit. crown (1858); divided into two provinces—(1) Bengal, and (2) Eastern Bengal and Assam (1905); owing to political unrest reconstituted (1912), and divided into Presidency, Burdwan, Darjeeling, Chittagong, Dacca, and Rajshahi divisions. Thanks to heavy rainfall and moist, warm atmosphere, production is enormous; mainly rice, but also pulse, jute, opium, sugar-cane, oilseed, tobacco, ginger, pepper, tea, cinchona, spices, tussore silk, timber, etc.; great mineral wealth—coal, iron, saltpetre; manufactures jute fabrics, gunny bags, cottons, silk, canvas, muslin, and pack-thread; good communications by rail and river. Cap. Calcutta; the secondary cap. is Dacca.

Administration under a governor assisted by executive council of three members and legislative council of fifty. See MAP CENTRAL AND S. ASIA.

Inhabitants are of many races; majority of Mohammedan religion, Hinduism next in numerical importance. Area, with native states of Cooch Behar and Hill Tippera, 84,092 sq. mi.; pop., 46,300,000.

BENGAL, BAY OF (16° N., 88° E.), triangular portion, Indian Ocean, between India and Burma.

BENGALI is the Eng. name of *Bangla-*

Bhasa, one of the four principal languages of India, spoken by about 45,000,000 people, mainly in the extensive district of the Lower Ganges. One of the earliest writers in this language was the poet Candi Dās (end of XIV. cent.), who established a school of poets devoted to the honor of Krishna.

BENGAZI (32° 6' N., 20° 20' E.), seaport N. Africa; good roadstead but harbor shallow; starting point for caravans trading with interior; exports oxen, sheep, and sponges. Pop. 35,000.

BENGUELLA (12° 42' S., 13° 8' E.); seaport, Angola, W. Africa; exposed roadstead about a mile from shore; exports amber, rubber, ivory; connected by rail with Lobito Bay, whence railway to interior is being built.

BENHADAD, name of three kings of Syria.

BENI (11° S., 66° 10' W.).—(1) department, N.E. Bolivia, S. America; fertile country; cocoa, hides; area, 102,100 sq. miles; pop. 37,300. (2) river, Bolivia, rises La Paz; joins the Mamoré.

BENI-HASSAN, SPEOS ARTEMIDOS (27° 53' N., 30° 56' E.), village, Upper Egypt; numerous tombs with paintings of very early period.

BENI-ISRAEL (sons of Israel), Jewish people settled for cent's on Malabar coast.

BENIN (6° 30' N., 5° 40' E.), part of Southern Nigeria; lies to W. of Niger R.; produces rice and other economic plants; exports great quantities of palm oil. In E. is capital, Benin (6° 20' N., 5° 30' E.), where is Brit. residency. Chief river, Benin (5° 50' N., 5° 20' E.), flows to Atlantic. B. first discovered by Portuguese, XV. cent.; French and Dutch afterwards made settlements here; for time center of slave trade; under Brit. protection since 1897.

BENI-SUEF (29° 9' N., 31° 13' E.), town, Egypt. Pop. 25,000.

BENTOITE (BaTiSiO₆), colorless or bluish gem stone, hexagonal crystals, discovered in California.

BENJAMIN, in Old Testament the youngest s. of Jacob; specially beloved by his f.; his mother Rachel d. in giving him birth; traditional founder of tribe of B., within territories of which lay Jerusalem and other famous towns; among its members were King Saul, Jeremiah, and St. Paul.

BENJAMIN, JUDAH PHILIP (1811-84), Anglo-Amer. lawyer and politician; compiled digest of cases of New Orleans and Louisiana; Confederate Sec. of State (1862-65); Q. C. (1872).

BENJAMIN OF TUDELA (fl. XII. cent.), Jewish rabbi and traveler in East; his account of his journeys is valuable.

BENJAMIN, PARK (1849-1922), Amer. lawyer and author; joint editor of *Scientific American* (1872-8); author of *The Age of Electricity* (1886).

BEN LOMOND (56° 11' N., 4° 37' W.), mountain (3,192 ft.), E. side of Loch Lomond, N.W. Stirlingshire, Scotland.

BENNETT, ENOCH ARNOLD (1867), Eng. novelist and playwright, most of whose novels describe 'the Five Towns' in the Staffordshire Potteries with consummate realism and artistic restraint. His best known books are *Clayhanger*, *Sacred and Profane Love*, and *The Old Wives' Tale*. Among his plays are *Cupid and Common Sense*, *Milestones* (with Edward Knoblauch), *The Great Adventure* (1913); *Sacred and Profane Love* (1919) *The Love Match* (1922).

BENNETT, GRANVILLE GAYLORD (1882), bishop, was b. at Deadwood, S. D., and studied at the University of Nebraska and at Seabury Divinity School, Faribault, Minn. He was ordained priest of the Episcopal church in 1907, and has worked in Faribault, and at the Cathedral of Our Merciful Savior in Holdrege, Nebraska, and in St. Paul's Church, Minn. Since 1920 he has been bishop coadjutor of Duluth.

BENNETT, JAMES GORDON (1795-1872), an American journalist, was b. at New Mill, Keith, Scotland, of French extraction. He entered a Catholic seminary at Aberdeen with a view of becoming a priest, but after a three years' course, came to America, arriving at Nova Scotia in 1819. He taught bookkeeping for a time, but with little success. He moved to Boston, where for three years he held a position as a proof reader. He then came to New York and wrote for various newspapers, and later went to Charleston, S. C., where he translated articles from the Latin-American papers for the *Courier*. He returned to New York and established a commercial school, at the same time doing work for newspapers. In 1827 he became Washington correspondent of the *New York Enquirer*, his reports on the proceedings of Congress establishing his reputation as a journalist. In 1829 there was a consolidation of the *Courier* and *Enquirer*, and he became an associate editor and a recognized leader in politics. He gave up his editorial position, went to Philadelphia, and there acquired an interest in the *Pennsylvanian*, of which he became the editor. Of an independent nature, he

was averse to becoming the tool of politicians, and this led to his leaving Philadelphia. He returned to New York and invested his savings (about \$500) and his experience in starting a small 4-page newspaper, which he sold for a cent and called the *New York Herald*. He was its sole editor, reporter and contributor, the office being in a cellar in Wall Street. To this paper, Bennett brought new views; he was under no party control, and the dissemination of news from all parts of the world became his chief object. He exposed frauds, printed facts and not merely opinions, and praised everything calculated to benefit mankind in general. It was he who originated newspaper articles on the state of the money market and detailed reports of public occurrences. He also gave reports of sermons and proceedings of public meetings and was the originator of printing interviews with celebrities. He was the first to use the telegraph for reporting. All these and other novel features rapidly increased the circulation of the *Herald* and it soon became the most valuable newspaper property in the country. Bennett was a man of strong personality, which he impressed on his paper; he also directed every detail of its management and was largely instrumental in forming public opinion. He d. in New York.

BENNETT, JAMES GORDON, son of above (1841-1918), Amer. journalist, proprietor of the *New York Herald*; he fitted out, in conjunction with the *Daily Telegraph*, Stanley's expedition to find Livingston (1874), also the Jeannette Polar Expedition (1879). Donor of the cup competed for annually by automobilists, and of the 'Bennett Trophy' for the best long-distance flight.

BENNETT, RICHARD (1872); actor and theatrical manager, was b. in Cass Indiana, and educated at Kokomo High school and Logansport Normal school. He has played in *Charley's Aunt*, *Jane*, and in the great Barrie success, *What Every Woman Knows*. He also prepared and adapted for the American stage the Brieux play, *Damaged Goods*, himself appearing both as George Dupont and as the Doctor. For two years he was associated with the late Charles Froham in producing plays. He won a striking success in Eugene O'Neill's tragedy *Beyond the Horizon*.

BEN NEVIS (56° 48' N.; 5° W.); mountain, S.W. Inverness-shire, overlooking Fort William; highest peak (4,406 ft.) in Brit. Isles, observatory on top now closed.

BENNIGSEN, LEVIN AUGUST COUNT VON (1745-1826), distinguished

Russ. general; led most successful charges, culminating at Leipzig, against Napoleon.

BENNO (1010-1106), bp. of Meissen and Church reformer; canonized 1523.

BENNINGTON, a town of Vermont, in Bennington co., of which it is the county seat. It is on the New York Central Railroad. It includes several villages. Its industries include woolen mills and knit goods factories. In the neighborhood are important deposits of iron ore. Bennington is famous historically for being the scene of a battle fought on August 16, 1777, when General Stark, with his 'Green Mountain Boys' defeated a large British force sent by General Burgoyne to capture the public stores in Bennington. A memorial battle monument commemorates this event. Pop. 1920, 9,982.

BENOÎT DE SAINTE-MAURE, XII.-cent. Fr. *trouvère*, who wrote a verse chronicle of the Dukes of Normandy, from Rollo onwards, in some 40,000 lines.

BENOÎT, PETER LEONARD LEOPOLD (1834-1901), Flemish composer; attempted unsuccessfully to found a distinctly Flemish school of music; composed operas, oratorios, cantatas, etc.; his oratorio *Lucifer* was produced in London (1888).

BENSARADE, ISAAC DE (1613-91), Fr. poet; author of *Cleopatra* (1635), a tragedy, *Metamorphoses d'Ovide* (1676), rendered in form of rondeaux. B. enjoyed the patronage of Richelieu and Anne of Austria; chief employment writing words for court ballads.

BENSON, ARTHUR CHRISTOPHER (1862), author, s. of Archbishop Benson; Master of Magdalene, Cambridge; best known for his *House of Quiet*, *The Upton Letters*, and *From a College Window*. In collaboration with Lord Esher edited *Selections from the Correspondence of Queen Victoria* (1907). His *Hugh, Memoirs of a Brother* (1915), is an account of Robert Hugh Benson.

BENSON, EDWARD FREDERICK (1867), novelist, s. of Archbishop Benson; wrote *Dodo*, *The Luck of the Vails*, *The House of Defence*, *The Climber*, *Robert Linnet*, etc., as well as a comedy, *Dinner for Eight*.

BENSON, EDWARD WHITE (1829-96), Archbishop of Canterbury, formerly head master of Wellington Coll. and Bishop of Truro. His most important works are a *Life of Cyprian* and studies on the *Apocalypse*.

BENSON, FRANK WESTON (1862),

painter, was b. at Salem, Massachusetts. He received a technical education in school, and studied drawing and painting at the Museum of Fine Arts, Boston, at the Julien Academy in Paris. He has held the post of instructor of drawing and painting at the Museum of Fine Arts in Boston since 1889. He has been the recipient of many medals and prizes amongst them being medals from the Chicago Exposition of 1893, the Carnegie Institute, 1899, and two prizes from the Boston Art Club and two from the Jordan Gallery, Boston; also a silver medal from the Paris Exposition of 1900 and two gold medals from the St. Louis Exposition in 1904.

BENSON, ROBERT HUGH (1871-1914), author and R.C. priest.

BENSON, WILLIAM SHEPHERD (1885), naval officer, was b. at Macon, Ga. In 1877 he graduated from the U.S. Naval Academy, reaching the rank of rear admiral in 1915. He has served in various capacities in the U.S. Naval Academy, and at sea in all duties as high as division and squadron commander. He has been commandant of the Philadelphia Navy Yard and in 1915 was appointed chief of naval operations. He was a member of the commission appointed by President Wilson to confer with the Allied Powers in Europe in 1917. He was also a naval representative in drawing up naval terms for the armistice with the Central Powers. He retired in 1919 after 47 years active service.

BENT GRASS (*Agrostis*), genus of grass, with numerous species, distinguished by open panicle and small spikelets with only one flower each.

BENT, JAMES THEODORE (1852-97), Eng. author and traveler; with his wife made extensive journeys in Italy, South Africa, Asia Minor.

BENTHAM, GEORGE (1800-84), Eng. botanist, nephew of Jeremy B.; ed. in France; called to bar; author of important work on logic, numerous botanical papers, and, in collaboration with Sir Joseph Hooker, of *Genera Plantarum*, a masterpiece of systematic bot.

BENTHAM, JEREMY (1748-1832), Eng. writer on law and political economy; s. of attorney; b. Houndsditch; called to Bar but refused to plead; gave himself up to philosophical writing, publishing *Fragment on Government*, or a *Comment on the Commentaries* (1776), against Blackstone's conception of perfection of Eng. constitution; *Principles of Morals and Legislation* came out in 1789, *Defence of Usury* 1816; established Westminster Review, 1823.

BENTHOS, marine plants and animals which live on the sea-floor, attached there, or capable of only limited wanderings.

BENTINCK, WILLIAM CAVENDISH (1774-1839), 2nd s. of 3rd Duke of Portland; introduced reforms into Indian administration, and became first Governor-General of India (1833-35).

BENTINCK, WILLIAM GEORGE FREDERICK CAVENDISH (1802-48) commonly called Lord George Bentinck, younger s. of 4th Duke of Portland; prominent Whig politician; promoted enfranchisement of Irish and Jews, but opposed Free Trade, and was formidable opponent of Peel; cut great figure in sporting world.

BENTIVOGLIO, GIOVANNI (1443-1508), tyrant of Bologna, deposed by French.

BENTIVOGLIO, GUIDO (1579-1644), Ital. cardinal, diplomatist, and author.

BENTLEY, RICHARD (1662-1742), Eng. scholar; b. Oulton (Yorks); ed. Wakefield and Cambridge; master of Spalding Grammar School (1682), but soon resigned to become tutor to the son of Dr. Stillington, Dean of St. Paul's. He remained with this family for six years, and upon the dean being app. bp. of Worcester, accompanied his pupil to Oxford, where he became noted for his learning, and delivered the Boyle lectures on the *Evidences of Natural and Revealed Religion*; having taken his degree at both univ's, he took holy orders, with a view to ecclesiastical preferment. His letter to Dr. Mill, editor of the Gk. chronicler John Malalas, in 1691, and his famous *Dissertation on the Epistles of Phalaris*, established his reputation as the greatest scholar of his age. In 1700 he was app. Master of Trinity Coll., Cambridge; in 1717 Regius Prof. of Divinity.

BENTLEY, RICHARD (1794-1871), Eng. publisher; originally a printer; began business as publisher in conjunction with Henry Colburn, 1829; B's *Miscellany*, which first appeared 1837, was edit. for three years by Charles Dickens.

BENTON, GUY POTTER (1865), university president, was educated at Baker University and at the Ohio Wesleyan University. He also studied at the University of Wooster and in Berlin. For some years he was a superintendent of schools in Kansas, later becoming assistant state superintendent of public instruction in the same state. From 1896 to 1899 he was professor of history and sociology at Baker University, later

becoming president of Upper Iowa University, Miami University and of University of Vermont since 1911. He is a member of innumerable scholastic associations and during the war served in Paris in connection with the Y.M.C.A. He is the author of *The Real College* published in 1909.

BENTON, THOMAS HART (1782-1858), Amer. statesman; senator for Missouri, 1821-51, and leader of Democratic party. B's great interest was expansion of U.S.A. westward, advocating annexation of Oregon and Texas; disapproved of slavery, and lost his seat in Senate for refusing to forward grievances of Southerners.

BENTON, a city of Illinois, the county seat of Franklin co. It is on the Illinois Central and other railroads. Its most important industry is the manufacture of stoves. It is the center of an important coal mining region. Pop. 1920, 7,201.

BENTON HARBOR, a city of Michigan, in Berrien co. It is on the St. Joseph River and on the Pere Marquette, the Cleveland and Cincinnati, the Chicago and St. Louis, and the Michigan Central railroads. A ship canal connects it with Lake Michigan. The city has an excellent harbor and steamboat lines operate to Milwaukee and Chicago. Its industries include the manufacture of furniture, flour, lumber, etc. Medicinal springs in the neighborhood have made the city an important summer resort. Pop. 1920, 12,233.

BENTZON, THÉRÈSE (1840), pseudonym of Marie Thérèse Blanc, Fr. novelist and critic; has written large number of novels and volumes of short stories. Best novels, characterized by serious moral tone, are *La Vocation de Louise* (1873); *L'Obstacle* (1879); *Tony* (1884), and *Constance* (1891).

BENUE (7° 50' N., 6° 40' E.), river, W. Africa; principal tributary of Niger.

BENVENUTO CELLINI See CELLINI, BENVENUTO.

BENZALDEHYDE, C₆H₅CHO. Also known as artificial essential oil of almonds. A colorless liquid having a fragrant odor resembling bitter almonds. Specific gravity 1.0504, boiling point 179.9° C. Soluble in water, alcohol and ether. It is prepared by heating benzal chloride under pressure with milk of lime and calcium carbonate, or by the oxidation of toluol, or by treating benzol with a mixture of gaseous carbon monoxide and hydrogen chloride in the presence of cuprous chloride or aluminum bromide. It is used as a flavoring

agent, in perfumery, and in the manufacture of dyestuffs. On exposure to air it oxidizes to benzoic acid.

BENZENE, BENZOL (C_6H_6), colorless, mobile, highly refracting, volatile liquid having inflammable vapor; M.P. 5.4° , B.P. 80.4° ; Sp. G. 0.899 at 0° ; solvent for fats, resins, etc.; important in dyeing industry for preparation of its derivatives; of great theoretical interest, its molecule being formed by a ring of six carbon atoms, to each of which one hydrogen atom is attached; the derivatives are termed aromatic or benzenoid compounds.

BENZENE HYDROCARBONS. A series of aromatic hydrocarbons having the general formula C_nH_{n-6} . The simplest of the series is benzene itself, C_6H_6 , and others of almost equal importance are toluene, $C_6H_5CH_3$, xylene, of which there are three isomeric forms, all having the formula $C_6H_4(CH_3)_2$, ethylbenzene, $C_6H_5C_2H_5$, and cymene, $C_6H_4(CH_3)_2C_2H_5$. Most of the hydrocarbons of this series are colorless mobile liquids, which distill without decomposition. They are inflammable, insoluble in water, but miscible with alcohol, ether, petroleum, etc., in all proportions. They are good solvents for fats, resins and other substances which will not dissolve in water. To this property they owe much of their commercial and scientific value, but they have many other uses, some of them of still greater importance. Most of them are widely used in the manufacture of dyestuffs, and other organic preparations; from toluene are manufactured the explosive T.N.T., benzoic acid, saccharine, and various perfumes. The series shows a gradual change in physical properties with increasing molecular weight, but this is only apparent when corresponding compounds are compared—a group for instance, of mono-substitution products, when the boiling point will be found to rise steadily with the molecular weight. All the hydrocarbons of the series are very stable and can be split up into compounds containing fewer carbon atoms only by means of powerful chemical action, such, for instance, as can be brought about by strong oxidizing agents.

BENZIDINE, *Di - para - diamino - diphenyl* ($NH_2.C_6H_4.C_6H_4.NH_2$), di-acid base crystallizing in scales; M.P. 122° , B.P. 360° ; of technical importance in preparation of cotton dyes.

BENZOATE OF SODA. $NaC_6H_5O_2$. A white, amorphous crystalline or granular powder, usually odorless, but occasionally possessing a faint odor of benzoin. It has a sweetish, astringent taste, and is soluble in water and alcohol. It is

obtained by neutralizing benzoic acid with a solution of sodium carbonate, filtering, concentrating and allowing to crystallize. It is used in medicine and possesses the same properties as benzoic acid, but is less irritating and more easily administered owing to its solubility. Its chief uses are in the treatment of cystitis, gout and rheumatism, although it has some value as an expectorant. It was formerly very widely used as a preservative in foods, but its use along these lines is limited by law in nearly all civilized countries. In the U.S.A. when benzoate of soda is used in a food product, the fact and the amount must be stated on the package. Its presence is discovered by acidifying, extracting with chloroform, oxidizing to salicylic acid and then adding ferric chloride solution, when a violet-red coloration is produced.

BENZOIC ACID. C_6H_5COOH . An aromatic acid, occurring as white or faintly yellowish crystalline plates or needles. When pure, it is without odor, but occasionally the commercial product has a pleasant aromatic odor of gum benzoin. It is slightly soluble in cold water, readily so in boiling water, alcohol, ether and chloroform. Specific gravity 1.2659, melting point $121.25^\circ C$, boiling point $249.2^\circ C$. It may be prepared from gum benzoin by sublimation. The gum is broken into small pieces, and heated gently on a sand-bath. The acid sublimes and is collected, the yield being about 4 per cent. It is now commonly manufactured by oxidizing toluene. The toluene is first chlorinated to benzyl chloride, and then oxidized with nitric acid; or benzo-trichloride is first produced and then decomposed by heating with milk of lime under pressure. Benzoic acid has many industrial applications. It is used in the coal-tar color industry, in tooth pastes, and in medicine. It has valuable antiseptic properties and finds wide use as a preservative. The presence of 0.1 per cent. inhibits the growth of most bacteria. Its action in medicine is similar to that of salicylic acid. Taken internally, it is rapidly absorbed, combines with glycocoll in its course through the kidneys and is excreted as hippuric acid. It is used in genito-urinary diseases to diminish the putridity of the urine, and also as an expectorant. Its use as a preservative in foodstuffs is looked upon with disfavor, although its sodium salt is permitted in small quantities (see **BENZOATE OF SODA**). When heated with lime it yields benzene and calcium carbonate, and when distilled over zinc dust it yields benzaldehyde.

BENZOIN.—(1) (C₆H₅CHOH.CO.C₆H₅) colorless crystalline solid. M.P. 137°; B.P. 343°. (2) Gum Benjamin, yellowish-brown balsamic resin, obtained from *Styrax benzoin*, used in preparation of antiseptic ointments and the antiseptic tincture (friar's balsam), and as an incense.

BENZOL. See **BENZENE**.

BENZOPHENONE (*Diphenyl Ketone*) (C₆H₅.CO.C₆H₅), a dimorphous aromatic ketone; B.P. 306°. Its derivative, *Tetramethyl-diamido-benzo phenone*, CO[C₆H₄N(CH₃)₂]₂, is important technically in dye-stuff manufacture.

BENZYL ALCOHOL, PHENYL CARBINOL (C₆H₅CH₂OH), colorless aromatic liquid; B.P. 206°.

BEOWULF, earliest Eng. epic, in which are incorporated many Teutonic traditional stories; considered the parent of modern literatures; it probably first took shape in V. or early VI. cent., but date and still more, place of action are matters of discussion; it is in West Saxon dialect, but possibly translation from Northumbrian; theory that Boulby, Yorks, was 'B's by' has been heatedly advocated and rejected; the single MS. containing the story is in the Cottonian Collection (Vitellius, A 15), Brit. Museum, and was probably copied out c. 1,000 A.D.

BÉRANGER, PIERRE JEAN DE (1780-1857), Fr. song-writer; b. Paris. When on the brink of starvation (1802) he besought the patronage of Lucien Bonaparte, who made him a small allowance; later he procured a clerkship in the univ. Between 1808-12 were written and handed about, *Les Gueux*, *Le Boeuf Gras*, and the *Petit Homme Gris*; while his *Roi d'Yvetot* (1813) made his name familiar throughout France. In 1815 his songs were collected into a vol., and in 1821 a second vol. appeared, for which B. was imprisoned for three months. In 1825 *Chansons Nouvelles* appeared, and in 1828 *Chansons Inédites*, for the publication of the latter of which, containing his democratic and anti-papal views, he was fined 10,000 francs and imprisoned for nine months. *Dernières Chansons*, his last vol., was pub. in 1857.

BERAR, OR HYDRERABAD ASSIGNED DISTRICTS (21° N., 77° E.), one of Central Provinces of India, E. of Bombay; the dominion of the Nizam; formed part of dominions of Mahratta Rajah of Negpur; assigned by Nizam to Brit. government, by treaties of 1853 and 1861; since 1903 under administration of commissioner-general for Central Provinces; fertile plateau; grain, cotton; area, 17,711 sq. miles. Pop. 3,082,000.

BERAT (40° 44' N., 19° 59' E.), town, vilayet Jannina, Albania; wine. Pop. 10,000.

BERBER (17° 56' N., 34° E.), town (and province), Anglo-Egyptian Sudan; on E. bank Nile; commercial center. Pop. 13,000.

BERBERA (10° 30' N., 45° E.), chief seaport town, Somaliland, N.E. Africa; annual fair of inland tribes, Oct. till April, attended by 20,000 persons. Pop. c. 3,500.

BERBERS, people of Hamitic race ranging over N. Africa southward to the Senegal, forming three-fifths of the pop. of Algeria, and a still larger proportion of the people of Morocco.

BERBICE (6° 10' N., 57° 30' W.), district, Brit. Guiana, S. America. Pop. 40,000.

BERCHEM, NICOLAAS, BERGHEM (1620-83), Dutch artist; b. Haarlem; much esteemed for his landscapes, some of which have been engraved by John Visscher; works in Amsterdam Museum, and at St. Petersburg.

BERCHTA, BERTA, figure of S. Ger. mythology; mentioned XIV. cent.; name still used to frighten children who misbehave.

BERCHTOLD, LEOPOLD ANT. JOH. SIGISMUND, COUNT VON (1863), Austrian statesman, who early abandoned his Austrian nationality in favor of that of Hungary. After holding various minor positions in diplomatic service he became ambassador to Russia (1906). In 1912 he succeeded Aehrenthal as Austro-Hungarian foreign minister, and one of his first announcements was: 'It will be our honest endeavor to maintain our traditionally good relations with England.' But he was only a figure-head, the tool of the aggressive military and clerical groups whose policy he was forced to carry out under the domination of Tisza, the Hungarian premier. At end of first Balkan War (1912) he prompted Bulgaria to attack Serbia, hoping that the defeat of latter would open up for Austria the road to Salonica and the Aegean. Following the Serajevo incident, Berchtold presented the fatal ultimatum to Belgrade, which was a challenge not only to Serbia but to Russia and the Allies. Following on differences with Tisza in Jan. 1915 he resigned office, and in March of the following year received an appointment at court.

BERDICHEV (49° 53' N., 28° 35' E.), town, Ukraine, Russia; silk, iron. Pop. c. 75,000.

BERDYANSK (46° 40' N., 36° 52' E.), port, Sea of Azof, Russia; grain. Pop. c. 30,000.

BEREA COLLEGE, in Berea, Ky., a co-educational institution, founded in 1855, in the center of a wild, rugged region with a backward culture. It has five departments; the Normal School, the Vocational School, the Academy of High School Departments, the College Department and the Foundation Department. In 1922-3 the enrollment was 2,675 and the faculty numbered 140, the president being William James Hutchins.

BERENGAR I., king of Italy (887-924); crowned emperor, 915; murdered after life of warfare; his grandson, B. II. (d. 966), was crowned 950; died prisoner of Emperor Otto I.

BERENGARIA OF NAVARRE, m. 1191, Richard I of England.

BERENGARIUS, see **BERENGER DE TOURS**.

BÉRENGER DE TOURS, BERENGARIUS (998-1088), Fr. theologian who denied transubstantiation and founded sect condemned by several councils.

BERENICE (23° 53' N., 35° 34' E.), ancient seaport, W. of Red Sea, Egypt.

BERENICE, name of several Egyptian and Jewish princesses, one of whom was mother of Ptolemy Philadelphus, another his dau.; another was dau. of Ptolemy Auletes and elder sister of the notorious Cleopatra; still another B. was dau. of Salome, wife of Aristobulus and sister of King Herod I.

BERENSON, BERNHARD (1865), writer, was b. at Wilna, Russia, and educated at Harvard. He resides in Florence, Italy, and has written extensively on Italian art, his works including *Venetian Painters of Renaissance*, *The Study and Criticism of Italian Art*, and *A Sienese Painter of the Franciscan Legend*. He has also contributed a number of articles to English, French, Italian and German reviews of art and archaeology.

BERESFORD, LORD CHARLES WILLIAM DE LA POER, ST. BARON (1846-1919), Brit. admiral and politician; second son of 4th Marquis of Waterford; famous for gallantry in Condor at bombardment of Alexandria (1882); commanded Channel Squadron (1903-5); admiral (1906); commander of Mediterranean Fleet (1905-7); commander of Channel Fleet (1907-9); M.P. (Unionist) for Portsmouth (1910-16); raised to peerage (1916); was keen naval critic and leader of the 'Big Navy' party.

BERESFORD, J. D. (1873), English novelist, is the s. of the late Rev. J. J. Beresford. He was educated at Oundle and Peterborough. At the age of 18 he came to London and was articled to a firm of architects. He practiced architecture for some years and in 1906 he began to write for the magazines. In 1911 he published *Jacob Stahl*, a novel which created a certain amount of stir, following it by *A Candidate for Truth*, *House Mates*, *The Prisoners of Horling*, etc. He is also the author of *A Royal Heart* (in collaboration with the late Arthur Scott Craven) and *The Compleat Angler* (with Kenneth Richmond). He has also written numerous short stories and critical articles.

BERESFORD, WILLIAM CARR BERESFORD, VISCOUNT (1768-1854), Eng. general; illegitimate s. of George de la Poer Beresford, 1st Marquis of Waterford; distinguished in Peninsular War; cr. Baron of Albuera and Dungarven, 1814; viscount, 1823; general, 1825.

BEREZINA (52° 50' N., 29° 30' E.), river, Minsk, Russia, tributary of Dnieper; noted for disastrous passage of Napoleon's army in retreat from Moscow, 1812.

BERG (48° 55' N., 8° 4' E.), former duchy of Germany; right bank of Rhine; ceded to Prussia, 1815.

BERGAMO (45° 42' N., 9° 41' E.), city and province, Italy; formerly belonged to Venice; cathedral; silks. Pop. c. 60,000; province, c. 542,000.

BERGAMOT, OIL OF, a limpid, greenish-yellow fragrant fluid, used in perfumery and microscopical preparations.

BERGEN (60° 20' N., 5° 22' E.), seaport and fortified town at head of Byfjord, Norway; founded 1070; formerly principal Nor. port; second largest town; cathedral, museum, and churches; tourist center; birthplace of Ole Bull and Edvard Grieg; fish and fish products. Pop. 91,000.

BERGEN-OP-ZOOM (51° 30' N., 4° 18' E.), town, N. Brabant, Holland; pottery; former fortress; attacked by British, 1814. Pop. 15,500.

BERGER, VICTOR L. (1860), editor and United States congressman, was born at Nieder Rebbuch, Austria-Hungary. He was educated in the Gymnasium and University of Budapest and of Vienna, but before he had completed his studies, his family suffered financial reverses, which caused them to emigrate to America. Here he worked at various

trades, and later became teacher in a public school. Becoming identified with the activities of the socialists and a founder of the American Socialist Party, the local party leaders at Milwaukee made him editor of the Milwaukee 'Daily Vorwaerts,' since when he has been editor of several other socialist newspapers and periodicals. He was delegate to the People's Party Convention at St. Louis in 1896, and tried to organize the Debs sentiment in that convention. He is also international secretary for the United States of the International Socialist Bureau, of Brussels, Belgium. In 1904 he was Social Democrat candidate for mayor of Milwaukee and also for Congress. He was elected to the 62nd Congress (1911-13), being the first Socialist to enter that assembly.

BERGH, HENRY (1820-1888), Amer. philanthropist and writer, was born in New York and educated at Columbia College. In 1861 he entered the diplomatic service, and for three years was secretary of the American Legation and U.S. consul in St. Petersburg. In 1865 he founded the American Society for the Prevention of Cruelty to Animals, and the following year was instrumental in securing the passage of an act which gave the society the power to make arrests and institute prosecutions for violations of the statute in regard to cruelty to animals. He was the first president of the society and held the post until his death, giving it his whole time and receiving no compensation. When he first began this work, there were no laws in any of the states relating to cruelty to animals, but when he died 39 states had statutes on the subject and 36 branch societies of his organization were in existence. The work later extended to South America and to Canada. His published works included *The Streets of New York* and a play, *Love Alternative*, which was produced with success in Baltimore. Bergh was also founder of the Society for the Prevention of Cruelty to Children.

BERGK, THEODOR (1812-81), Ger. philologist; pub. *Poetae Lyrici Graeci* (1843), *Griechische Literaturgeschichte* (1872-87), and editions of Anacreon and other classical authors.

BERGSON, HENRI (1859), Fr. philosopher, prof. at the College de France, and exponent of the *Philosophy of Change*, according to which previous systems of thought attach too much importance to knowledge. Life is first to be explained, and gives a key to the nature of knowledge. Knowledge has a value in serving life. The intellect and

instinct are two modes of the mind's activity, developed along different lines of evolution, to serve the needs of the organism. But in 'intuition' we have a power of apprehending reality directly, a sympathetic attitude by which we seem to enter into it. Elected to French Academy, 1914. During World War was entrusted with missions to U.S.

BERHAMPUR (19° 18' N., 84° 49' E.), town, Madras presidency, Brit. India; silk weaving. Pop. c. 25,500.

BERI-BERI, a form of peripheral neuritis. The disease occurs mainly in the tropics and is prevalent in China, Japan, Malay, Africa, the West Indies, Cuba, Panama and South America. It has, however, been carried to other countries by shipping. The early symptoms of the disease are a numbness of the legs, followed by a swelling of the face and ankles. The muscles of the limbs then become paralyzed. Two forms of the disease are known—dry and wet. In dry beri-beri paralysis of the muscles is followed by acute difficulty in breathing, and frequently by heart failure and death. In wet beri-beri dropsical conditions develop which may affect the lungs with fatal results. For many years the cause of the disease baffled investigators, and a specific cure was sought without success. Of recent years, however, the remarkable results following the researches into the existence and nature of vitamins, have thrown much light on the subject, and have indicated that it is largely, if not entirely, caused by improper diet. The lack of so-called vitamin B, is found to produce peripheral neuritis, and the introduction into the diet of foods rich in this vitamin relieve the symptoms or cause them to disappear entirely.

BERING SEA (limited by 52°-65° N., 160° W.-160° E.) is connected with Arctic Ocean by Bering Strait, crossed about middle by 65° 52' N., 168° W.

BERING, VITUS, BEHRING (1680-1741), Dan. discoverer after whom are named Bering Sea (55° N., 180° E.), part of Pacific Ocean between Aleutian Islands and B. Strait; Bering Strait (65° N., 169° W.), channel connecting Arctic and Pacific Oceans, and separating Alaska and Siberia; and Bering Island (55° 17' N., 165° 26' E.), island, S.W. part, B. Sea, where B. died.

BERING SEA CONTROVERSY, a dispute between U.S. and Great Britain arising out of pelagic sealing in Bering Sea. U.S. claimed (1) that they had exclusive jurisdiction over Bering Sea; (2) that seals were domestic animals, and therefore Amer. property when captured;

(3) that they should be protected. Arbitrators decided against U.S. (1893), but closed area around Pribylov Islands. This prohibition proved ineffectual, and in 1911 a convention, effective for fifteen years, was proclaimed between U.S., Great Britain, and Japan, prohibiting pelagic sealing in Pacific Ocean N. of 30° N. lat.

BERKELEY, a town of California, in Alameda co. It is on the Southern Pacific and the Atchison, Topeka and Santa Fe railroads. It is 8 miles N.E. of San Francisco directly across San Francisco Bay. Berkeley is the seat of the University of California and the State Agricultural College. Here also is the State Institution for the Deaf, Dumb and Blind and several college preparatory schools. The town has important industries, including the manufacture of soap and iron. A fire in September, 1923, swept over a portion of the residential district of the city and caused considerable damage, but the work of rebuilding is going steadily forward. San Francisco commuters form a large proportion of the population. Pop. 1920, 56,036; 1923, 62,995.

BERKELEY, GEORGE (1684-1753), Irish philosopher; b. Kilkenny; ed. Trinity College, Dublin; resolving to establish center of Christian civilization in Bermuda, he went to Rhode Island (1728), but, as promised grant was not paid, he returned (1731); bp. of Cloyne, 1734.

BERKELEY, SIR WILLIAM (c. 1608-77), Brit. gov. of Virginia.

BERKOWITZ, HENRY (1857), rabbi, was born at Pittsburgh, Pennsylvania. He was educated at Cornell University and studied law in a Pittsburgh law firm for three years. In 1883 he became a rabbi and has been stationed in Mobile, Alabama, in Kansas City and in Philadelphia. He is connected with various Jewish and philanthropic societies and is a founder and the first secretary of the Central Conference of American Rabbis.

In 1893 he founded the Jewish Chautauqua Society, of which he was also the chancellor. He is the author of *Bible Ethics*, *First and Second Union Hebrew Readers*, *Judaism and the Social Question*, *Sabbath Sentiment in the Home*, etc., and has contributed extensively to periodicals on religious topics.

BERKSHIRE (51° 28' N., 1° 15' W.), county, England, lying S. of Thames, which separates it from Buckinghamshire and Oxfordshire; borders also on Hampshire, Surrey, Wiltshire; eastern part contains Bagshot Heath and Windsor Park and is well wooded with oak, beech,

ash, elder, hazel; crossed by rivers Ock, Kennet, Loddon, and by two canals.

BERKSHIRE HILLS, hill district, watered by four rivers, in W. Massachusetts; famous summer resort.

BERLAND (46° 14' N., 27° 43' E.), town, Rumania. Pop. 25,000.

BERLICHINGEN, GOETZ or GOTT-FRIED VON (1480-1562), Ger. knight called *Iron-Hand*, cousin of Conrad von Berlichingen; lost hand in war and wore iron hand, still preserved; regarded as last knight of chivalry.

BERLIN, a city of New Hampshire, in Coos co. It is on the Grand Trunk and Boston and Maine railroads. There is excellent water power which is used in the manufacture of paper pulp and lumber. The city has a public library, theatres, a hospital and handsome municipal buildings. Pop. 1920, 16,104.

BERLIN, city, cap. of republic of Prussia and of Ger. Empire, on Spree (52° 30' N., 13° 24' E.), was residence of Hohenzollern family from 1442 to 1918; sacked several times during Thirty Years' War; suffered in Seven Years' War and Fr. revolutionary wars. Its importance dates from time of Great Elector, Frederick William, by whom modern town was laid out. His son, Frederick I., constructed Friedrichstadt (1688); there has been enormous building activity since 1870.

Height is c. 100 ft. above sea; site level; well laid out, with many fine streets; third town in size, and before World War perhaps cleanest in Europe. The Spree divides city into two parts; on its r. bk. are oldest parts, Old Berlin, with the Rathaus, and, finally united to it in 15th cent., Old Kölln, with royal palace, on an island. Seventy-five per cent. of buildings are modern, a large proportion being very good modern Renaissance work showing Fr. influence; principal old buildings are Kloster Kirch and three other churches. Principal street is famous Unter den Linden, over a mile long, formed by three avenues of lime trees; it contains numerous public buildings, government offices, statues, etc., and claims to be finest street in Europe. It is entered at W. end by Brandenburger Thor, celebrated gateway, copied from Propylæa, Athens, leading to the chief park, the Tiergarten, in the E. of which is the magnificent Sieges Allee (Avenue of Victory), lined with marble statues of the Hohenzollerns, and leading to the Königsplatz, where stands the lofty column of Victory (1873, commemorating the triumph over France). Here also are the new Reichstag building

BERLIN ACT

(1884-94), a new royal opera-house, and monuments to Bismarck and Moltke; also a royal palace, an enormous rectangular building in the Renaissance style. The Schlossbrücke is adorned with eight groups of marble statuary. Opposite the palace is the new Renaissance cathedral. Other important streets run parallel, and at right angles, to Unter den Linden, the ground having been systematically laid out. Leipziger Strasse is a busy thoroughfare through which traffic flows over Leipziger Platz, Potsdamer Strasse, and Potsdamer Platz, to the W.; Friedrichstrasse, with its famous shops, stretching for over 3 m., starts from Belle-Allianceplatz, and crosses Unter den Linden and Leipziger Strasse on its way N. to its continuation, the Chausseestrasse. Wilhelmstrasse, street of palaces, starts like Friedrichstrasse at Belle-Allianceplatz, and runs to the Linden; from same center Königstrasse radiates to Leipziger Platz; in it are War Office, General Post Office, etc., and most fashionable shops. There are many modern churches, including new cathedral. Univ., founded 1810, N. of Opern Platz, is foremost in Germany; near it is the Royal Library. The National Gallery and museums are all near the Lust-Garten; theatres are numerous. There are many bridges over river, and everywhere are statues and monuments; W. end is favorite residential quarter; in E. are works and factories, in N. foundries, and in N.W. hospitals, law courts, etc.

Berlin's geographical situation in center of N. Prussia and of waterways covering dist. between Elbe and Oder, and at crossing of lines of communication between Brandenburg, Silesia, Saxony, Hanover, Mecklenburg, and Pomerania, is commercially advantageous. Great manufacturing city; produces woollens, cottons, porcelains, earthenware, machinery, metal goods, beer, paper, gold, silver, and bronze work, hardware, etc. Pop. 3,000,000.

BERLIN ACT (1885) was the outcome of a conference of thirteen European powers and U.S. which took place at Berlin to dispose of (1) the international rivalry for control of the Congo; (2) the conflicting claims of France and Britain to Niger; (3) the competition of the powers to effect annexations on African coast. As a result the boundaries of the Belgian Congo State were defined, and freedom of trade established in the whole of the basin of that river. Freedom of navigation was also established on the Niger, the execution of the treaty being entrusted to France and Britain for the upper and lower reaches respectively. With regard to future

BERLIN TREATY

annexations, notification to the other powers was laid down as indispensable, and each power was required to secure freedom of trade and transit in its African possessions. The treaty was ratified by all the powers except U.S.

BERLIN, CONGRESS OF, took place in 1878, to reconsider terms of Treaty of San Stefano between Turkey and Russia, which had caused dissatisfaction to other powers, in particular to Britain and Austria. Representatives of Britain, France, Austria, Germany, Russia, and Turkey met on June 13, and on July 13, Treaty of Berlin was concluded, which considerably modified that of San Stefano. By it Bulgaria was divided into Bulgaria proper and Eastern Rumelia; Bosnia and Herzegovina were to be occupied by Austria; Rumania, Serbia, and Montenegro were to be made independent; and Ardahan, etc., ceded to Russia.

BERLIN, TREATY OF, drawn up by the great Powers of Europe, in Berlin, by a Congress which met in Prince Bismarck's Palace, on June 13, 1878. The purpose of the Congress was to revise the Treaty of San Stefano, which had been agreed upon by Turkey and Russia, on March 3, 1878, after Turkey had been severely defeated by the Russians in the Russo-Turkish War of that year. By the San Stefano Treaty a Greater Bulgaria was to have been created, reaching down to the Aegean Sea, Turkey being practically expelled from Europe. The Western Powers, however, fearing that Bulgaria might thus become a powerful nation under the tutelage of Russia, demanded a revision. This was accomplished at the Berlin Congress, at which England, France, Germany, Austria-Hungary, Italy, Russia and Turkey were represented, the representatives of Greece, Montenegro and Serbia being present in an advisory capacity. Eighteen articles of the San Stefano Treaty were either revised or eliminated. Rumania, Servia and Montenegro were established in complete independence, but Bulgaria was reduced to half size, the southern half, Eastern Rumelia, being returned to Turkey, the freed portion remaining under the influence of Turkey as a vassal state. Bosnia-Herzegovina was also allowed to remain under Turkish sovereignty, theoretically but was subjected to the administrative control of Austria-Hungary. Lord Beaconsfield, British Premier, has generally been regarded as the moving spirit behind the Berlin Treaty. The document had an evil effect on later events and may truly be said to have been the chief of the contributing causes of the World War, since it left the Balkan

BERLIN UNIVERSITY

peoples, and especially the Bulgarians, in a very discontented state, from which resulted the constant turmoil that finally had its crisis in the declaration of war by Austria-Hungary against Serbia, in 1914.

BERLIN, UNIVERSITY OF, one of the leading educational institutions of Europe, founded in Berlin, Germany, in 1810, while Wilhelm von Humbolt was Prussian Minister of Education, who organized the Prussian school system, with the University at its head. Within ten years it had become the most influential institution of its kind in Germany, some of the leading German scientists, including such men as Hegel and Niebuhr, being on the faculty. This standing it has maintained ever since. It has departments of theology, medicine, law, science, literature, including courses in all the subjects relating thereto. Before the war it had a faculty of 377 and a student body of 14,000, which included many students from other countries, including the United States, foreigners being especially encouraged. The institution is state owned, is administered by the rector and a senate, and the full body of the faculty. The students and the faculty are subject to special laws of the University, which has police and judicial power over its members. Women are admitted as well as men. During 1906-14 it maintained a chair at Columbia University and one at Harvard University, in return for which those two American universities sent permanent professors to Berlin.

BERLINER, EMILE (1851), inventor, was born in Hanover, Germany, and was educated at Wolfenbuttel. In 1870 he came to the United States and seven years later invented loose contact telephone transmitter. He later discovered that a loose contact will act as a telephone receiver, and was the first to use an induction coil in connection with transmitters. In 1887 he invented the gramophone, the first talking machine, known also as the Victor Talking Machine, and for this invention he was awarded the John Scott Medal and the Elliot Cresson Gold Medal by the Franklin Institute, Philadelphia. He has also invented and perfected the method at present in use of duplicating disc records. Since 1901 he has led a vigorous campaign against the dangers of raw milk and has written many pamphlets dealing with the prevention of sickness. He was the originator and a member of the Washington Milk Conference in 1907.

BERLIOZ, HECTOR (1803-69), Fr. musical composer; b. Côte-Saint-André;

BERNARD OF CHARTRES

s. of physician; pioneer of the Romantic movement in music; influenced as all the Fr. *Romantiques* were, by England. His compositions include an opera, *Benvenuto Cellini*, *Damnation de Faust*, *Romeo et Juliette*, *Beatrice et Benedict*, which are the glories of Fr. music; *Autobiography* (trans., 1905).

BERMONDSEY, S.E. metropolitan borough of London; parliamentary borough of Southwark; tanneries. Pop. 126,000.

BERMUDAS, SOMERS ISLANDS (33° N., 65° W.), islands, mid-Atlantic, belonging to Britain; area, 20 sq. miles; administered by resident gov., assisted by executive and legislative councils, and House of Assembly. Soil is poor; frost unknown; produce potatoes, tomatoes, and other vegetables, arrowroot, bulbs, all of which are exported. Pop. 20,000. See MAP WORLD.

BERMUDEZ (9° N., 64° W.), state, N.E. Venezuela, between Orinoco River and Caribbean Sea; area, 32,243 sq. miles. Pop. 310,000.

BERN, or **BERNE**.—(1) Cap. Switzerland and of canton Berne (46° 57' N., 7° 26' E.), situated on rocky peninsula, almost surrounded by riv. Aar; commands magnificent Alpine views of Bernese Oberland; principal buildings, Gothic Münster, Federal Council Hall, univ., museum; bear pit (*bern* signifies a bear); textiles, mathematical instruments, musical boxes; made free imperial city (1218); federal cap. (1848). The city is the center of several international bureaus—(e.g.), Copyright Union, International Postal Union, etc. Pop. 91,000. (2) Canton, Switzerland; most populous and second largest in area; contains Bernese Oberland in S.; mountain pine forests; fertile valleys; majority of inhabitants German-speaking Prot.; grain and cattle; watch making, wood carving. Area, 2,657 sq. m.; pop. 642,700.

The Berne Convention, revised in 1908, secures reciprocity of copyright to the contracting countries. It applies to all great European countries except Austria-Hungary, Russia, and Turkey, and to Japan, etc.

BERNADOTTE. See **CHARLES XIV OF SWEDEN**.

BERNARD, CHARLES DE (1804-50), Fr. novelist; author of *Le Nosud Gordien* (1838); *Gerfaut* (1840); *La Peau du lion* (1841), and other stories.

BERNARD OF CHARTRES (c 1167), Fr. philosopher; leader of the Chartres school of Platonic philosophers; referred to by John of Salisbury.

BERNARD, CLAUDE (1813-78), Fr. physiologist, noted for researches on poisons, functions of pancreas, and glycogenic function of liver.

BERNARD, ST. (1090-1153), Fr. monastic reformer; b. Burgundy; s. of Tescelin, a knight of noble birth; entered monastery of Cîteaux, 1112; chosen as one of party to found daughter monastery of Clairvaux, where life was rigidly ascetic. B. became famous, 1130, for support of election of Innocent II. to Papacy; rebuilt Clairvaux, 1135; preached Second Crusade, 1145, and when it failed tried to reorganize it.

BERNARD, ST., OF MENTHON (923-1008), founder of monasteries and hospices at passes of Alps (Gt. and Little St. B.); feast, June 15.—Great St. Bernard, pass, from the Valais in Switzerland to Aosta, Italy; known to Romans, who erected temple at highest point; named after St. B., who established hospice here; Augustinian convent since XII. cent.; St. B. dogs assist in rescue of travelers from snow.—Little St. Bernard, pass, also honored by Romans with temple, and by St. Bernard with a hospice; joins valleys of Isère and Aosta.

BERNARD, SIR THOMAS, BART. (1750-1818), gov. of Massachusetts.

BERNARDINE OF SIENA, ST. (1380-1444), Vicar-General of Observant Order (Franciscan), and popular preacher of wide fame.

BERNAUER, AGNES (d. 1435), a baker's dau. who secretly m. Albert, s. of Duke of Bavaria-Munich. When the marriage was discovered by the duke she was arrested, condemned for witchcraft, and drowned in the Danube; subject of several plays.

BERNAYS, JAKOB (1824-81), Ger. philologist and author of a number of works on Gk. philosophers. His bro., Michael Bernays (1834-97), pub. critical works on Shakespeare, Goethe, and other writers.

BERNBURG (51° 47' N., 11° 43' E.), manufacturing town, Anhalt, Germany. Pop. 33,700.

BERNE. See **BERN.**

BERNERS, JOHN BOURCHIER, 2ND BARON (1467-1533), Eng. author and diplomatist; trans. *Froissart* (1523-25), *The Golden Book of Marcus Aurelius*, *The Book of Duke Huron of Bordeaux*, *Arthur of Little Britain*, etc.; style places him with Malory at head of last romance writers of Middle Ages.

BERNERS, JULIANA (b. c. 1388),

author of the famous *Boke of St. Albans* (1486), a treatise on hawking, hunting, and heraldry; said to have been prioress of Sopwell Nunnery, near St. Albans.

BERNESE OBERLAND (46° 30' N., 7° 30' E.), highland district of Bern, Switzerland; occupied by Bernese Alps, which culminate in Finsteraarhorn, Jungfrau, and Aletschhorn; among chief passes are Jungfraujoch, Gemmi, Gt. Scheidegg. Region includes summer resorts of Grindelwald, Interlaken, Meiringen, and great glaciers of Ober- and Unter-Grindelwald.

BERNHARD, DUKE OF WEIMAR (1604-39), Ger. general in Thirty Years War; youngest s. of Duke Johann III.; assisted Gustavus Adolphus to win battle of Lutzen for the Swedes; then won many battles for French against the Emperor.

BERNHARDI, FRIEDRICH VON (1849), Ger. writer on war, and soldier; served in Franco-German War (1870-1), and in World War on Eastern front; best known by his books: *Germany and the Next War* (1912), in which he advocated the doctrine 'world; power or downfall.' *How Germany makes War*, and *Britain as Germany's Vassal* were pub. in this country after the war had begun.

BERNHARDT, SARAH (1845-1923), Fr. actress; b. Paris; of Jewish descent; entered the Conservatoire at thirteen; début at the Comédie Française (1862); from 1880 her golden voice and dramatic power universally recognized.

BERNI, FRANCESCO (1497-1535), Ital. poet; held clerical position in the Vatican, and later received canonry in cathedral at Florence; stands easily at head of Ital. comic poets; chiefly known for rewriting of Boiardo's *Orlando Innamorato*, a crude poem which he turned into a classic of its kind.

BERNICIA, northern kingdom of the Angles; extended from Forth to Tyne; said to have been founded by Ida in VI. cent.; B. and Deira constituted Northumbria.

BERNICIAN SERIES, Lower Carboniferous rocks in Northumberland; corresponds to 'Dinartien' of Fr. geologists.

BERNINI, GIOVANNI LORENZO (1598-1680), Ital. artist; b. Naples; chiefly celebrated as architect and sculptor; designed Barberini Palace at Rome, and colonnade of St. Peter's; employed by Charles I. of England and Louis XIV. of France.

BERNIS, FRANÇOIS JOACHIM DE PIERRE DE (1715-94), Fr. cardinal

(1758), author and statesman; sec. of state for foreign affairs during Seven Years War.

BERNOULLI, BERNOULLI, eminent family of Basel, Switzerland; refugees from Antwerp, remarkable for their hereditary scientific ability, especially in math's. (1) Jacques B. (1654-1705) extended the use of the calculus and determined various curves; prof. and rector, Basel Univ. (2) Jean B. (1667-1726), *s. of* (2), Math's prof. in St. Petersburg. (4) Daniel B. (1700-82), *s. of* (2), gained international recognition sharing prize of *Academie des Sciences*, Paris, with Maclaurin and Euler; prof. of Math's, St. Petersburg; prof. of Experimental Physics in Basel. (5) Jean B. (1710-90), youngest *s. of* (2) succ. his *f.* in Basel. (6) Nicolas B. (1687-1759), *s. of* (3); met Halley and Newton in Eng.; Math's prof. in Padua; afterwards prof. of Logic in Basel. (7) Jean B. (1744-1807), grandson of (2) and *s. of* (5), astronomer in Berlin, afterwards mathematical director of the Akademie. (8) Jacques B. (1759-89), bro. of (7); traveled; succ. (4) in chair of Experimental Physics in Basel; afterwards prof. of Math's, academy of St. Petersburg.

BERNSTEIN, HENRI (1876), Fr. playwright who has attained great success, especially with *La Rafale* (1905) and *La Griffe* (1906).

BERNSTEIN, HERMAN (1876), author, was born at Neustadt-Scherwindt, on the Russo-German frontier of Poland. Both his parents were Russian, and with them he went to Mohilev in Russia residing there for several years. In 1893 he came to America, and for several years acted as special correspondent in Europe of the New York Times. He visited Tolstoi in Yasnaya Polyana and interviewed some of the most famous people in Europe. He is the founder of the Jewish daily paper *The Day*, and for two years acted as its editor, and 1916 has been editor of the American Hebrew. In 1917 he went to Russia as special correspondent of the New York Herald and published the secret correspondence between the Kaiser and the Czar. He is the author of *The Flight of Time* (poems), *In the Gates of Israel*, *Contrite Hearts*, and his interviews with distinguished people are collected under the title *With Master Minds*. He has also translated Chekhov's stories and plays, Gorky's *Foma Gordyev* and several of Tolstoi's posthumous works. He has acted as an adaptor of several plays including *Youth* and *The Snow Storm* and has the credit of having been instrumental in introducing to the Amer-

ican public the works of the Russian writer, Leonid Andreyev. In 1920-21 he went to Europe as special correspondent of the New York American in order to describe the new states created by the Versailles Peace Treaty.

BERNSTORFF, ANDREAS PETER, COUNT VON (1735-97), Dan. statesman; cr. count, 1767; became minister after Struensee's fall; renewed friendship between England and Denmark.

BERNSTORFF, CHRISTIAN GÜNTHER, COUNT VON (1769-1835), Dan. and Prussian statesman; Dan. ambassador successively to Sweden, Austria, and Germany; made Prussian Minister of Foreign Affairs, 1818.

BERNSTORFF, JOHANN, COUNT VON (1862), Ger. diplomatist; secretary to Ger. embassy, London (1902-06); Ger. ambassador at Washington (1908-17); from outbreak of Great War the Ger. embassy in U.S. was centre of plotting against American establishments making munitions for Allies, he, as ambassador, conniving in attempts at bribery, incendiarism, etc. In 1920 he pub. *My Three Years in America*.

BEROSUS, priest of Bel at Babylon; fragments of his history of Babylon have been handed down.

BERRI (45° 40' N., 1° 40' E.), ancient province, Central France, corresponding roughly to departments of Indre and Cher; country and people described in George Sand's later novels.

BERRY, CHARLES ALBERT (1852-99), Eng. congregationalist minister; pres. of Free Church Council and of Congregational Union.

BERRY, CHARLES FERDINAND, DUC DE (1778-1820), 2nd *s. of* Charles X. of France; assassinated by republican; memoirs written by Chateaubriand; his wife, CAROLINE FERDINANDE LOUISE, DUCHESSE DE B. (1798-1870), suffered imprisonment, 1832, for stirring up revolt against Louis Philippe in Vendée.

BERRYER, ANTOINE PIERRE (1790-1868), Fr. lawyer and politician; famous as orator in political prosecutions; strong legitimist.

BERSAGLIERI, company of marksmen in Ital. army, raised 1836; noted for speed and endurance.

BERSEKER (of disputed etymology).—(1) name of twelve sons of Scandinavian hero, Berserk; (2) any reckless Scandinavian warrior of Viking times.

BERTHA.—(1) St. B. (d. early VII. cent.), wife of Ethelbert of Kent;

persuaded him to accept Christianity.
(2) 'B. au grand pied' (d. 783), wife of Pippin the Short and mother of Charles the Great; subject of early literature.
(3) Sister of Charles the Great and mother of Roland in Arthurian romances.
(4) Wife of Rudolf II. of Burgundy; subject of many anecdotes; d. c. 1000.

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BERWICK, a borough of Pennsylvania, in Columbia co. It is on the Delaware, Lackawanna and Western Railroad and on the Susquehanna River. Its industries include iron works, steel manufactures, pipe works, pottery works,

etc. Pop. 1920, 12,181.

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BERWICKSHIRE (55° 46' N., 2° 25' W.), county, S.E. Scotland; county town, Duns; fertile productive district, many varieties of soil; agriculture principal industry; sheep and cattle largely raised; important fisheries; manufactures include paper, woollens, linens, brewing, distilling, tanning. Tweed is most important river, outlining S. border; also watered by Leader, Whiteadder, and other affluents of Tweed. Pop. 1921, 28,395.

BERWICK-UPON-TWEED (55° 47' N., 2° W.), walled town on N. side of mouth of Tweed; during Border wars frequently changed hands; in 1482 finally taken by English; for many years treated as independent county separate from England and Scotland, but since 1885 included in Northumberland; pop. 13,100.

BERWYN, a city of Illinois, in Cook Co. It is on the Chicago, Burlington and Quincy, and the Illinois Central railroad. The city has no important industries and is almost entirely residential. Pop. 1920, 14,150.

BERYL ($\text{Be}_3\text{Al}_2\text{Si}_6\text{O}_{18}$), gem-stone, related to emerald and aquamarine; hexagonal, pleochroic, variously colored crystals occurring in granitic rocks; often weathers into kaolin and mica.

BERYLLIUM, GLUCINUM ($\text{Be} = 9.1$), metallic element, isolated by L. N. Vauquelin (1798); S.G. 1.64; S.H. 0.4079. Its position in periodic system of elements has been much discussed.

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BESANÇON (47° 15' N., 6° 2' E.), town, France, on Doubs; cathedral, dating from IV. cent., and XVI. cent. town hall; considerable Rom. remains; seat of abp.; univ. and many schools; fortifications; principal industry, watch-making; metallurgical works, boots,

paper, leather, hosiery, etc.; distilling; birthplace of Victor Hugo. Pop. 60,000.

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BESICLOMETER, optician's instrument for measuring forehead and eyes for dimensions of spectacles.

BESSARABIA, prov. Rumania, formerly Russia (47° 20' N., 28° 20' E.) lying between the Dniester and the Pruth; N. occupied by spurs of Carpathians, but W. flat and fertile; higher ground covered with wood, in low ground attention is paid to cattle breeding grain tobacco and vines; manufactures leather, soap, and candles; exports cattle, wool, timber, and grain. cap. Kishinev; portion between Pruth and Dniester added to Russia after war of 1877; became part of Rumania after Great War (1920). Area, 17,143 sq. m.; pop. 2,441,000.

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BESSEMER, a town in Alabama, in Jefferson co. It is on several important railroads and is 11 miles southwest of Birmingham. It is the center of an important iron and coal mining region

and its growth is the result of the development of these mines. It has large iron foundries, coke ovens, blast furnaces and machine shops and other plants connected with the iron and steel industry. There is a library, a hospital and other public buildings. Pop. 1920, 18,674.

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Molten pig iron is run into the tilted converter while the air blast is on. The converter is righted, and as the air is forced through the charge, the impurities, namely, sulphur, silicon, phosphorous, and carbon are oxidized. Twenty five minutes serve to complete this process, at the end of which time manganese and carbon are added in sufficient amounts to give a steel of the desired hardness and ductility. The charge together with sufficient slag to cover the top, thereby preventing further oxidation, is then dumped and run into molds. Bessemer converters have been adapted to the refining of copper.

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wars; said to have secured day at *Marengo*; colonel-general of the Consular Guard (1805-7), receiving Grand Eagle of Legion of Honor; won battle of *Medina del Rio Seco* (1808); commanded Imperial Guard cavalry in retreat from Moscow.

BEST, WILLIAM THOMAS (1826-97), Eng. organist; associated with Liverpool, where his performances at St. George's Hall made him famous throughout England; pub. *Organ Pieces for Church Use*.

BESTIA, surname of Rom. gens Calpurnia. One, Lucius Calpurnius B., was disgraced in war against Jugurtha; another was Catiline conspirator.

BESTIARY, favorite class of mediaeval book treating characteristics of animals as Christian symbols.

BESTOR, ARTHUR EUGENE (1879) President of the Chautauqua Institution, was born at Dixon, Ill. and educated at the University of Chicago. For two years he was professor of history and political science at Franklin College, Indiana, later going to the University of Chicago as a lecturer on political science. In 1905 he became assistant general director of the Chautauqua Institution, and afterwards director, and since 1915 he has been president of the Institution. During the war he was chairman of the committee on lecture and entertainments in training camps of the National War Work Council Y.M.C.A., and director of the speaking division of the Committee on Public Information.

BETA RAYS were first observed by Sir William Crookes, who found that when an electric current was passed through a vacuum tube, the negative pole gave off rays which faintly illuminated the molecules of the thin gas in the tube. They were later identified with one of the species of rays liberated by radium and were given the name Beta Rays by Sir Ernest Rutherford. Still later they were named Electrons, and were recognized as particles of electricity. The atoms of matter are now believed to consist of a positive nucleus, to which are attached electrons or negative particles of electricity. Radio-active substances spontaneously liberate from their atoms these particles, giving rise to the Beta Rays. They travel at an immense velocity, varying from 10,000 to more than 100,000 miles per second, according to conditions. They are more than a thousand times smaller than the smallest known atom, and their mass is $\frac{1}{1835}$ of that of an atom of hydrogen—the lightest gas known. The electric current is now believed to

be caused by the rapid motion of electrons from atom to atom along the conductor. Beta Rays pass through opaque bodies, affect a photographic plate, promote chemical action and have many other remarkable properties which are still only partially investigated.

BETAINE, *Oxymurine*, *Lycine* ($\text{C}_2\text{H}_5\text{NO}_2$), methyl hydroxide of dimethyl glyccoll, occurring in sugar beet, vetch, cotton seed, and wheat.

BETELGEUSE, one of the fixed stars in the constellation of Orion. It is also known as Alpha Orionis. It is notable for the experiments carried on by Prof. Albert A. Michelson of Chicago University, to ascertain its dimensions. He found that Betelgeuse is slightly more than 300 times the diameter of the sun and nearly as large as the entire orbit of the planet Mars. These experiments were carried on in 1920 by means of a device invented by Professor Michelson for determining the actual diameter of the star. The diameter of Betelgeuse was found to be 260 million miles, or 27 million times as large as the sun in volume. Its distance from the earth is about 150 'light years', with light traveling at the rate of 186,000 miles a second.

BETEL NUT, seed of betel palm, *Areca catechu*, is extensively used by the inhabitants of tropical Asia for chewing. The b. leaf is produced from b. vine (*Charica betel*).

BETHANY (31° 46' N., 35° 17' E.), village, foot of Mount Olivet, Palestine; mentioned in New Testament as home of Martha, Mary, and Lazarus.

BETHANY COLLEGE, in Bethany, W. Va., a co-educational institution chartered by the state legislature in 1840, with an endowment of \$420,000, its physical assets being about \$500,000. The courses include the classics, sciences, philosophy, theology, agriculture, domestic science, normal and music. The faculty numbers about 35 and the student enrollment amounts to about 500.

BETHEL (31° 55' N., 35° 20' E.), ancient city, Palestine: resting-place of Ark.

BETHENCOURT, JEAN DE (c. 1360-1422), Fr. adventurer; wrote *Le Canarien* (account of conquest he claimed to have made of Canary Islands).

BETHESDA.—(1) sacred spring in Jerusalem where remarkable cures were said to be performed (*St. John* 5:1). (2) (53° 12' N., 4° 3' W.), town, Carnarvonshire, Wales; slate quarries. Pop. 1919, 4716.

BETH-HORN

BETH-HORN, two neighboring villages, Palestine; 12 miles N.W. of Jerusalem.

BETHLEHEM (31° 33' N., 35° 13' E.), town, Palestine; birthplace of David and (according to Matthew, Luke and John) of Jesus Christ; convent containing Grotto of the Nativity; cave where St. Jerome translated the Bible.

BETHLEHEM, a borough of Pennsylvania in Southampton co. It is on the Lehigh Valley, the Central of New Jersey and other railroads, and on the Lehigh River. Bethlehem was founded by the Moravians in 1741 and is the chief center of that denomination in the United States. There is a Moravian Theological Seminary and a Moravian school for Young Women. At the opposite side of the river, which is spanned by two bridges, is South Bethlehem, the seat of Lehigh University. There are many important manufacturing establishments, including the Bethlehem Steel Works, silk mills, rolling mills, foundry and machine shops. South Bethlehem, West Bethlehem and Northampton Heights now form part of Bethlehem. Pop. 1920, 50,353; 1923, 59,628.

BETHLEHEMITES, orders in R.C. Church. (1) Knights to fight Turks, founded 1459. (2) B. of Guatemala, existed 1650-1850.

BETHLEN, GABRIEL (1580-1629), Prince of Transylvania by election, 1613; elected king of Hungary, 1620, but refused crown; compelled the Emperor Ferdinand II. to grant religious toleration in Hungary by Peace of Nickolsburg, 1621.

BETHMANN - HOLLWEG, THEOBALD VON (1856-1921), German statesman, born at Hohen-Finow, Mark of Brandenburg, educated at Bonn Univ., where he became a friend of the ex-Kaiser; entered civil service and was Prussian home secretary (1905), vice-chancellor of Prussian ministry (1907), and imperial chancellor (1909-17). He has been called 'the incarnation of the passionate doctrinarism which appealed to the heart of William II.' Shortly after the outbreak of the Great War he admitted German criminality in the invasion of Belgium, which he defended on the ground that 'necessity knows no law.' He told the Brit. ambassador (Sir Edward Goschen) that the treaty which was thought to guarantee Belgium's neutrality was just 'a scrap of paper.' In the summer of 1915 acute differences arose between him and Admiral von Tirpitz regarding the submarine 'blockade,' which finally resulted in the latter's resignation. Controversy,

BETTIA

however, was not stilled, Bethmann-Hollweg being suspected of showing undue deference to the U.S., and generally restraining the military leaders. He declined to define Germany's war aims, and in July 1917 a crisis arose in the Reichstag which led to his dismissal by the Kaiser at the instigation of the military party. He published (1919) a volume of *Memoirs*, giving his version of the events which led to the war, and a defence of his policy.

BETHNAL GREEN, eastern metropolitan and parliamentary borough, London; museum. Pop. 125,000.

BETHSAIDA. (1) Tn., Palestine (32° 54' N., 35° 37' E.), E. of riv. Jordan; scene of two of Christ's miracles. (2) Tn., W. of Jordan (32° 52' N., 35° 33' E.), birthplace of Philip, Andrew, and Peter (Mark. 6:45).

BÉTHUNE, tn.; dep. Pas-de-Calais, France (50° 30' N., 2° 35' E.), 20 m. W.S.W. of Lille, in the centre of a rich coalfield; connected with La Bassée and Lille by canal, which during the Great War was the junction between the Brit. and Fr. forces from Oct. 1914, till the latter half of 1915; became an important point in the Brit. communications. In battle of the Lys (April, 1918) the Germans advanced to within 3 m. of Béthune (April 12), when center of town suffered very heavy damage from the enemy's long-distance artillery.

BETONY, mint-like herb (*Stachys Betonica*); purple flowers; perennial.

BETROTHAL, marriage-pledge made between two persons; with the early Jews the b. was as binding as the marriage ceremony; and in France and Germany at the present day it is still of considerable importance. In England the laws regarding b's have never been very clearly defined, and have sometimes led to the parties concerned, particularly in country districts, regarding b. as a license for cohabitation; damages through breach of promise may be recovered at common law.

BETTERMENT, legal term for appreciation of value of real property; when it accrues without effort or expense of owner, known as 'unearned increment,' to obtain taxation of which many attempts have been made.

BETTERTON, THOMAS (1635-1710), Eng. actor; made first appearance at the Cockpit, Drury Lane (1660); considered greatest actor of his time. He introduced movable scenes in place of tapestry hangings.

BETTIA (28° 46' N., 84° 30' E.);

town, Bihar and Orissa, India; indigo. Pop. 24,696.

BETTWS-Y-COED (53° 6' N., 3° 48' W.), town, Carnarvonshire, Wales; artist and tourist resort.

BETTY, WILLIAM HENRY WEST (1791-1874), Eng. actor; known as 'the Young Roscius'; b. Shrewsbury; first appearance, at age of twelve, at Belfast; he quickly won immense popularity. He retired from stage (1808).

BETUL (21° 35' N., 78° E.), town and district, Central Provinces, India; plateau surrounded by belt, hilly, forest country; Tapi flows through S. portion; inhabitants are Gonds; cotton, teak; area, 3826 sq. miles. Pop. 285,400; pop. of town, 4700.

BETWA (24° 30' N., 78° 20' E.), river, Bhopal, Brit. India, tributary of Jumna.

BEUGNOT, JACQUES CLAUDE, COUNT OF (1781-1835), Fr. politician; made count of the empire by Napoleon, 1808; author of valuable autobiography.

BEUST, FREDERICH FERDINAND, COUNT VON (1809-86), Austrian statesman; represented Ger. diet in London conference on Schleswig-Holstein question, 1864; Minister of Foreign Affairs at Vienna, (1866); pres. of the council and chancellor of the empire (1867); concessions made to Hungary were due to him; he opposed the papal party and abolished the Concordat.

BEUTHEN, OBERBEUTHEN (50° 21' N., 18° 55' E.), town, Prussia Silesia; coal. Pop. 677,000.

BEVEL, sloped or canted edging to solid body, as glass, wood, etc.; rule with two jointed arms adjustable to an angle.

BEVELAND, NORTH (51° 33' N., 3° 47' E.), island, Holland.

BEVELAND, SOUTH (51° 27' N., 3° 52' E.), island, Holland.

BEVERIDGE, ALBERT JEREMIAH (1862), an American legislator, b. in Adams County, Ohio. As a youth he endured great hardship, being a plow-boy at 12, a railroad laborer, a logger and a teamster before 15, but during this period taught himself and later managed to enter De Pauw University, graduating in 1885. Two years later he was admitted to the bar and began to practice in Indianapolis. He was elected on the Republican ticket to the state legislature, then to the U.S. Senate, where he served during the terms of 1899-1905 and 1905-11. Here he became a nationally recognized political leader, with extremely liberal tendencies.

In 1912 he joined ex-President Roosevelt in forming the new Progressive party and was chairman of the first national convention of that party, held in Chicago, in 1912; unsuccessful candidate for U.S. senatorship in 1922. He is the author of *The Russian Advance* (1903); *The Invisible Government* (1912); *What is Back of the War* (1915), and *A Life of John Marshall* (2 vols., 1919).

BEVERIDGE, WILLIAM (1637-1708), bp. of St. Asaph; Anglican author much read in his time.

BEVERLAND, ADRIAN (1654-1712), Dutch theological writer much persecuted for his writings; good scholar.

BEVERLEY (53° 51' N., 0° 26' W.), market town, near river Hull, E. Riding, Yorks; St. John's Church (the Minster), favorite destination of mediæval pilgrims, is a magnificent building showing arch. of different periods and contains the Percy shrine; leather, agricultural implements. Pop. 13,700.

BEVERLY, a city of Massachusetts, in Essex co. It is on the Baltimore and Ohio Railroad and is 2 miles north of Salem. Beverly contains several villages and is connected by electric railway with Salem, Peabody, Gloucester and other towns. Here is the New England Institute for the Deaf and Dumb. Its most important industry is the manufacture of boots and shoes. It has also an important shipping and fishing trade. The neighborhood of Beverly contains the summer residences of many business men of Boston and other cities. Beverly was founded in 1688 and was incorporated in 1894. Pop. 1920, 22,561.

BEVIS OF HAMPTON, Eng. XIII-cent. metrical romance showing strong Fr. influence. B. was s. of Guy, Count of Hampton, who was murdered at his wife's instigation, the s. being eventually sold into slavery. In the East he became enamored of a princess, named Josiane, whom he eventually married. The romance is chiefly occupied with the account of his wonderful exploits. It has been pub. by the Abbotsford Club (1838) and Early English Text Society (1885).

BEWICK, THOMAS (1753-1828), Eng. woodengraver; b. near Newcastle-on-Tyne; apprenticed to a local engraver, Bellby, whom he afterwards joined in partnership; celebrated for his engravings for *British Birds* (1797-1804), *Quadrupeds*, Goldsmith's *Traveller* and *Deserted Village*.

BEXHILL (50° 51' N., 0° 28' E.), watering-place, Sussex, England. Pop. 16,000.

BEXLEY (51° 27' N., 0° 8' E.), town, on Cray, Kent, England. Pop. 16,000.

BEXLEY, NICHOLAS VANSITTART, BARON (1766-1851), Eng. politician; Chancellor of Exchequer (1812-23); cr. baron (1823); Chancellor of the Duchy of Lancs. and Cabinet minister (1823-28).

BEY (Turkish *Bey* or *Beg*, a prince). (1) hereditary ruler of Tunis. (2) Turk. grandee.

BEYBAZAR (40° 5' N., 31° 20' E.), town, Angora vilayet, Asiatic Turkey; rice.

BEYLE, MARIE HENRI (1783-1842), Fr. author of beginning of Romantic movement; *nom de plume*, Stendhal; saw military service under Napoleon, but after the emperor's fall retired to Milan, where he made the acquaintance of Manzoni, Silvio Pellico, Lord Byron, and other men of letters; chiefly remembered by his two novels, *Le Rouge et le noir* and *La Chartreuse de Parme*.

BEZANT, originally a Byzantine gold coin, of the value of \$2, widely circulated throughout Europe down to middle of XIII. cent. Silver b's were used in England during XIII. and XIV. cents. Also a heraldic figure, represented by a gold circle, introduced during the Crusading period.

BEZBORODKO ALEXANDER ANDREEVITCH, PRINCE (1747-99), grand chancellor of Russia; became adviser of Catherine II., and guided Russ. affairs. The advantageous terms of peace made with Gustavus III. (1790), and the Turks (1792) were due to him, as was also third partition of Poland. B. retained entire control after death of Catherine, becoming chancellor.

BEZE, THEODORE DE, THEODORUS BEZA (1519-1605), Fr. theologian; prof. of Greek at Lausanne, later prof. of Theol. at Geneva; on Calvin's death became leader of the Protestants there; wrote the greater part of the Huguenot Psalter, and edited the *Vulgate*, besides other theological works.

BEZIERS (43° 20' N., 3° 12' E.), town, on Orb, Hérault, France; ancient ramparts; remains of Rom. amphitheatre; fine Gothic church; scene of massacre, Albigenian War, 1209; distilleries. Pop. 55,000.

BEZIQUE, card game, played with a double pack.

BEZOAR (from Persian *Padsahr*, an antidote to poison), a ball found in stomachs and intestines of ruminants, formed by concretion of salts, etc.,

round particle of foreign matter; supposed to have medicinal uses.

BEZWADA (16° 31' N., 80° 39' E.), town, on Kistna, Madras, India; commercial center. Pop. 24,000.

BHAGALPUR (26° N., 86° 45' E.).—(1) division, Bengal, India; includes districts of B., Monghyr, Purnea, Sonthal Parganas; area, 18,602 sq. miles. Pop. 7,850,000. (2) district, situated in central part of division; level, well watered and cultivated in N., hilly in S.; grain, indigo; area, 4226 sq. miles. Pop. 2,088,500. (3) town, on Ganges; silk. Pop. 74,300.

BHAGAVAD GITA (=The Song of the Holy One), one of sacred books of Hinduism; it centers round Krishna. See **INDIAN LITERATURE**.

BHAGIRATHI (30° 48' N., 78° 22' E.), river, India.

BHANDARA (21° 7' N., 97° 37' E.), district, Central Provinces, Brit. India; contains number of little native tributary states; minerals; produces rice, grain, cotton; capital, Bandara, on Wainganga; area, 3965 sq. miles. Pop. 773,600.

BHANG, Indian term for hemp plant (*Cannabis sativa*); desiccated and otherwise prepared leaves used as narcotic and intoxicant.

BHARAHAT, BARHUT (24° 15' N., 80° 45' E.), village, state of Nagod, India; ruined city; interesting remains of a *stupa*, Buddhist period, III. cent. B.C.

BHARATPUR, BHURTPORE (27° 13' N., 77° 32' E.).—(1) native Jat state, Rajputana, India; level, fertile; only river, Banganga; cotton, sugar; area, 1982 sq. miles. Pop. 558,800. (2) capital, B. state; fort besieged by Lord Lake, 1805; taken by Lord Combermere, 1826. Pop. 56,400.

BHARTIHARI, Ind. poet (?VII. cent. A.D.) whose famous sayings have been translated into Western languages.

BHATGAON (27° 39' N., 85° 22' E.), town, Nepal, India. Pop. c. 30,000, mostly Brahmans.

BHATTIANA, tract of country, part of Hissar and Sirsa districts, Punjab, India.

BHAU DAJI (1822-74), Hindu physician and antiquarian; practiced med. with great success in Bombay, where he also took a prominent part in the promotion of education; author of many

papers on Sanskrit and Indian antiquities.

BHAUNAGAR, BHAVNAGAR (21° 45' N., 72° 12' E.).—(1) native state, Kathiawar, India; area, 2868 sq. miles. Pop. 441,360. (2) port, B. state; cotton. Pop. 60,700.

BHAVABHUTI (c. 700 A.D.); Ind. dramatist whose works are among greatest Sanskrit productions.

BHILS, BHEELS, a Dravidian tribe of India who lead nomad life.

BHILSA (23° 30' N., 77° 46' E.), town and district, Gwalior, Central India; Buddhist remains.

BHIWANDI (19° 17' N., 73° 4' E.), town, Bombay, India. Pop. 13,300.

BHIWANI (28° 46' N., 76° 18' E.), town, Punjab, India; commercial centre. Pop. 35,900.

BHOPAL (23° 15' N., 77° 26' E.), native state, Central India, founded by Afghan adventurer in XVIII. cent.; female succession since 1844; ruler styled Nawab Begum; supported British in Maratha wars and in Mutiny; people mostly Hindu, but ruling family Muhammadan; area, 6902 sq. miles. Pop. 1,050,700.

BHOPAWAR (22° 35' N., 75° 1' E.), native state, Central India; area, 1413 sq. miles. Pop. 698,500.

BHOR. (1) Feudatory state, Bombay Presidency, India; rice and nāgāli. Area, 925 sq. m.; pop. 144,600 (2) Chief tn. of above (18° 9' N., 75° 53' E.), 30 m. S. of Poona. Pop. 4,200.

BHUJ (23° 18' N., 69° 43' E.), capital of native state of Cutch, Bombay, India. Pop. 26,400.

BHUTAN (26° 40' to 28° 7' N., 88° 54' to 91° 54' E.), independent state, E. Himalayas; bounded N. by Tibet, E. by Towang country, S. by Brit. India, W. by Darjeeling, Sikkim, and Chumbi Valley. Area c. 20,000 sq. miles. Surface is mountainous, occupied by Himalayan ridges and spurs; watered by various tributaries of Brahmaputra. Climate varies according to elevation. B. produces rice, corn, millet; manufactures textiles. Inhabitants are chiefly Bhutias, racially allied to Tibetans. Religion is Buddhism. Chief towns, Punakha (capital) and Tasichozong. B. is administered by two supreme authorities, Dharma Raja and Deb Raja. See MAP CENTRAL AND S. ASIA. Part called the Dwar was annexed to Britain, 1865. Pop. c. 250,000.

BIALYSTOK.—(1) (53° 6' N., 23° 18'

E.), town, S.W. Russia. Pop. 63,927. (2) (53° N., 23° 30' E.), province, Russia.

BIARRITZ (43° 29' N., 1° 33' W.); fashionable watering-place, Basses-Pyrénées, S.W. France. Pop. 13,600.

BIAS (fl. VI. cent. B.C.), one of 'Seven Sages' of Greece; lived at Priene, Ionia; famous for wisdom of his councils and for philosophical fortitude.

BIBESCO, PRINCE ANTOINE (1878), Rumanian Minister at Washington since 1920. Grandson of late reigning Prince of Rumania. Educated in France. Councillor Rumanian Legation in London to 1912. Charge d'Affaires, Portugal, in 1914. Knight Commander of Isabelle the Catholic; Chevalier of the Legion of Honor. Married in 1919, Elizabeth Asquith, daughter of former Premier of Great Britain.

BIBLE, THE (Gr. *ta Biblia*, 'the books'), name given to collection of writings accepted by Christians as divinely inspired, and containing the record of God's revelation of Himself. There has been considerable dispute as to inclusion of some of books of Apocrypha in the canon. The Bible consists of two great parts, the Old and New Testaments, or, as the translators of the old Latin version preferred to call them, Testaments (Lat. *testamentum*). The Old Testament consists of (1) The Pentateuch, or five books of the Law; (2) The Prophets; and (3) The Hagiographa (writings concerning holy men), viz. Psalms, Proverbs, Job, The Song of Songs, Ruth, Lamentations, and other books not included under the Law or the Prophets. The New Testament written in Greek, consists of the Four Gospels, the Acts of the Apostles, the Epistles, and the Revelation of St. John. The O.T., most of which was written in Hebrew, was trans. into Greek at Alexandria about 270 B.C. by 70 translators; their version is known as the Septuagint. Both Old and New Testaments were trans. into Latin by St. Jerome (385-404), and the entire volume is known as the Vulgate. No ms. of the O.T. in the original Hebrew, except a small fragment belonging to the 1st or 2nd cent. A.D., dates from before the 9th cent.; and none of the N.T. in the Greek, except a small fragment dating from the 3rd cent., is earlier than the 4th cent., but commentators are generally agreed that the 1st cent. text has come down to us practically intact. A printed text of the O.T. Psalter was issued by Jews in Italy in 1475; the first complete Lat. Bible was printed at Soncino (1488).

The English Bible.—The earliest attempt to write any portion of the

Scriptures in the Eng. vernacular of which we have any record is attributed to Cædmon (d. 680), who was a monk of Whitby Abbey, and paraphrased certain portions of the Bible. He was followed by the 'Venerable' Bede (d. 735) of Jarrow, author of the *Eccles. Hist. of England*, who trans. a portion of the Gospel of St. John, while Ælfric, Abbot of Eynsham (955-1022), trans. the Pentateuch, Joshua, Judges, Kings, Job, Esther, Judith, and the Maccabees. The first complete trans. of the Vulgate into English was made by Wyclif about 1382, and this version was revised by John Purvey in 1388. With the introduction of printing in England (1477) and the wider diffusion of knowledge of the anc. languages, it became possible to work upon a broader textual basis. Renaissance scholars went back to the Gr. N.T. instead of relying on mediæval Lat. versions. This is especially notable in the N.T. of William Tyndale (pub. at Worms, 1525), and in the Pentateuch and other portions of the Scriptures trans. by him. The first complete Eng. Bible was that by Miles Coverdale, afterwards Bishop of Exeter, in 1535, which was founded on the Zurich Ger. versions. It is noteworthy that Coverdale was the first editor to take the non-canonical books from the body of the O.T. and place them at the end under the title of *Apocrypha*. In 1537 appeared a version known as 'Matthew's Bible,' which bore on the title-page the name of John Matthew, though the text is taken wholly from Tyndale and Coverdale. In 1539 was pub. 'the Great Bible,' a version of Matthew's Bible, undertaken at the instance of Cromwell, Earl of Essex. Several other versions followed, which differed only in minor particulars, and in 1604 James I. resolved to have a new trans. prepared; it was completed in 1611, and has continued to be the Authorized Version of the Eng. Bible down to modern times. The modern Revised Version, undertaken at the suggestion of the Convocation of the clergy, was commenced in 1870; the N.T. appeared in 1881, the O.T. in 1885, and the Apocrypha in 1895.

BIBLE CHRISTIANS, religious sect, founded by William O'Bryan (1815); sometimes called 'Bryanites.' O'Bryan was a Wesleyan Methodist local preacher of Luxillian, Cornwall, and his efforts were devoted to reclaiming the wreckers and smugglers of that coast.

BIBLE SOCIETIES are societies formed to circulate the Bible. The earliest in point of date is the Society for Promoting Christian Knowledge (S.P.C.K.), founded in 1698, which has

pub. versions of the Scriptures in 38 different languages; others are the Canstein Bible Institute, founded by Baron von Canstein at Halle (1710), the Bible Soc. (1780), later known as the Naval and Military Bible Soc.; the Fr. Bible Soc. (1792); the Religious Tract Soc. (1799), which carries on important home and foreign missionary work; the Brit and Foreign Bible Soc. (1804); the National Bible Soc. of Scotland; and the Hibernian Bible Soc. First Amer. Soc. at Philadelphia (1808); Amer. Bible Soc. (1816) pub. Bible in 100 tongues, including Arabic, Chin. dialects, and Amer. Indian, scribe mss. and printed books containing wood-block illustrations of events in Bible story.

BIBLE SOCIETY, AMERICAN, a Protestant organization that distributes the Bible or parts thereof at home and abroad in English or other languages. It dates from 1816, when it was formed in New York by a number of local bible societies, becoming incorporated in 1841. In 1852 the Society opened its famous Bible House at Astor Place in that city. Since its establishment it has printed and published about 145,000,000 Bibles and Testaments, and distributed them throughout the United States and the rest of the world, in more than 100 languages. It has one of the most complete printing plants in the United States. It aims to reach all parts of the globe, all peoples, races and countries, especially the solitary and destitute of all classes and conditions, and sells its publications at cost, or under cost, or gives them away. The people reached by the Society's bibles also include the blind. The Society has been the recipient of large legacies, notably \$850,000 bequeathed to it by the late John S. Kennedy. Mrs. Russell Sage added \$500,000 to its endowment fund, which was further increased by the Society raising another \$500,000. It is governed by a board of managers, 36 in number, one-fourth of whom retire each year, but are eligible for re-election. It lacks adequate funds to conduct its great work. Receipts for 1921 from invested funds, legacies, donors, sale of books, amounted to \$1,033,227, while the expenses were \$1,053,610. Affiliated with the Society are 150 auxiliary bible associations throughout the country, which assist in the circulation of the Scriptures and contribute to the work. The earliest of the societies which combined to form the larger organization were formed in Philadelphia, Hartford, Conn., Boston, New York and Princeton, N.J., in 1808 and 1809.

BIBLICAL CRITICISM relates to the textual examination of the Scriptures

by consulting their original sources, and also their study for internal evidence to strengthen or weaken their authenticity as inspired writings. For a long time the traditions and conjectures of Hebrew rabbis and Christian monks regarding the origin, date and authority of the different books of the Bible satisfied the majority of students. Such assumptions became hallowed by age and by the continued endorsement of the Church. The Protestant Reformation stimulated a penetrating spirit of enquiry into the sources of the Scriptures, and as time went on scientific methods of historical and literary research developed. Biblical investigation unfolded a complex problem, producing conclusions at variance with those held in an unscholarly age. The work of uprooting unfounded traditions went on in the face of much sincere though ignorant opposition, but enlightened modern thought has long since accepted the instructive results of biblical research as placing the Scriptures on a firmer foundation. Biblical investigators did not aim at destroying the essential truths of Holy Writ, but sought a reconstruction of the literature, history and theology with which the expression of those truths were interwoven, so that their teachings could be projected into clearer relief. For example, they have re-examined, by the help of the oldest sources and contemporary and other data, the history of the Israelites, the life of Jesus, and the record of the Early Christian Church, and have re-interpreted them according to the new light obtained. Textual criticism was necessary because of textual corruption arising from changes from the original form of the text, either deliberate or accidental. In the case of the Old Testament, original material is scanty, and much conjecture still prevails regarding the antecedents of many of its books, but there have been notable discoveries by archaeologists since the World War that may greatly augment the field for its further study. The New Testament has furnished abundant material, its chief sources being manuscripts numbering more than 3000, examination of which has yielded results of great value.

BIBLIOGRAPHY (older form, 'bibliology'), formerly meant the writing or transcription of books; but for nearly a cent. now the word has come to mean expert writing on books and Mss. with regard to points of variation between different editions, questions of authorship, binding, type, etc.; also a catalogue of books relating to some special subject or author.

BIBLIOMANCY, method of divination performed by a haphazard opening of the Bible and fixing the issue upon the first passage which strikes the eye.

BIBLIOTHEQUE NATIONALE, Paris, Fr. national depository of books, art treasures, etc.

BIBRACTE, ancient Gaulish town, capital of the Aedui; 8 miles W. of Autun, France; modern Mont Beuvray.

BICARBONATE. = Acid carbonate.

BICE, term for certain dark green or blue pigments.

BICHAT, MARIE FRANÇOIS XAVIER (1771-1802), Fr. physician, anatomist, and physiologist; conducted valuable researches in med., anat., and physiology.

BICHLORIDE OF GOLD. A compound of gold and chlorine stated to have the formula $AuCl_3$, also known as aurous chloraurate. The existence of this compound is, however, disputed by many authorities. Two other chlorides of gold are well recognized and readily prepared, namely Auric Chloride, $AuCl_3$, or gold trichloride, prepared by heating gold leaf or powder with chlorine, and Aurous Chloride, Au_2Cl_3 , obtained by heating the trichloride to $175^\circ C$. The bichloride is said to be formed when finely divided gold is heated from 140° to $170^\circ C$. in chlorine, the product being a dark red mass, which on addition of water is decomposed into gold and auric chloride. It is claimed, however, that this is not a distinct compound but consists merely of a mechanical mixture of metallic gold with auric chloride. The weight of evidence appears to support this view.

BICKERSTAFFE, ISAAC (1735-1812?), Eng. dramatist; b. in Ireland; author of many popular plays; name used as pseudonym by both Swift and Steele.

BICKMORE, ALBERT SMITH (1839-1914), educator, was born at St. George, Maine and educated at Dartmouth. He studied with Professor Louis Agassiz, becoming his assistant and going to Bermuda to collect for the Cambridge Museum. He traveled in the East Indian Archipelago, in China, Japan, Siberia and Russia. He became professor of natural history at Colgate University and from 1869-84 was superintendent of the American Museum of Natural History, and professor in charge of the department of public instruction since 1882. He delivered 418 lectures upon 213 different subjects, having collected data and gathered illustrations for these lectures during the course of

his wide travels.

BICKNELL, a city of Indiana, in Knox co. It is on the Indianapolis and Vincennes Railroad and on the White River. In the neighborhood are important coal mines. The city has grown rapidly. Pop. 1920, 7,635.

BICYCLE, See CYCLING.

BIDAR.—(1) (18° 33' N., 77° E.) district, Hyderabad, India; area, 4168 sq. miles. Pop. 766,129. (2) (17° 53' N., 77° 30' E.) town, India. Pop. 12,700.

BIDASSOA (43° 21' N., 1° 45' W.), river, France and Spain.

BIDDEFORD, a city of Maine in York co. It is on the Saco River and on the Boston and Maine railroad, 15 miles southwest of Portland. The city has excellent water power and has important manufactures of cotton goods. It has also large lumber interests and the quarrying of granite is important. The name is taken from Bideford, England. The city was settled in 1613 and became a city in 1655. There are banks, many churches and several publications. An electric railroad connects with Old Orchard Beach. Pop. 1920, 18,008.

BIDDER, GEORGE PARKER (1806-78), Eng. engineer; assisted George Stephenson in construction of London to Birmingham railway; designed Victoria Docks (London). George Parker B., Jun. (1836-96), s., authority on secret writing codes.

BIDDLE, CLEMENT (1740-1814), American Revolutionary soldier, was born in Philadelphia and educated as a Quaker. Early in life he went into business in Philadelphia. In spite of his Quaker training he joined a number of Quaker friends who had banded themselves together to form a military corps for the protection of some inoffensive Indians threatened by a body of bandits known as 'The Paxton Boys.' When the Revolutionary War broke out, Biddle took part in the battle of Trenton, and was later ordered to Washington where he received the swords of the Hessian officers. He also fought at the battles of Princeton and Brandywine and was present at Valley Forge. In 1780 he retired into private life, but subsequently was appointed Marshal of Pennsylvania by Washington as a mark of the high regard in which he was held by the latter.

BIDDLE, JAMES (1783-1848), Am. naval officer, was born in Philadelphia and educated at the University of Pennsylvania, entering the navy in 1800. He served as a midshipman in the war with Tripoli and was taken a prisoner

and kept in captivity for 19 months. In the War of 1812 he was a lieutenant on the Wasp when she captured the Frolic. For a short time he was a prisoner in Bermuda, but was later exchanged. In 1813 he took command of the Hornet and captured the British brig Penguin in which encounter he was wounded. In 1817 he was sent to take possession of Oregon for the U.S. and later was appointed commissioner to Turkey, and China, in 1845 negotiating the first treaty between the United States and China.

BIDDLE, JOHN (1615-62); 'Father of English Unitarianism'; established Unitarian conventicles; imprisoned for opinions (1645-52, 1654-58, 1662).

BIDDLE, JOHN (1859), army officer, was born at Detroit, Mich. He graduated from West Point in 1881, becoming a second lieutenant of engineers in the same year. For some years he was in charge of the river and harbor works at Nashville, Tenn., and during the war with Spain served as Lieutenant-colonel and chief engineer of the U.S. volunteers. He took part in the Porto Rico expedition and later served in Cuba and in the Philippine Islands. From 1907 to 1911 he was in charge of the river and harbor works at San Francisco and later at Savannah. In the early part of the European War, he served as observer with the Austro-Hungarian army in Austria and Poland, and in 1917 he was commander of the U.S. Railway regiments in France, the same year becoming assistant chief of staff. He retired from the service in 1920.

BIDDLE, NICHOLAS (1786-1844); Amer. financier, government director, 1819, and afterwards pres. of U.S. Bank; drew up *Commercial Digest*, long authority for international trade regulations.

BIDDLE, NICHOLAS (1879-1923), an American financier and soldier, born in Prescott, Arizona. He was the son of Brigadier-General James Biddle and graduated from Harvard in 1900. After spending several years in the South-western part of the United States and Mexico, he became trustee of the estate of William Astor and was also identified with many other financial interests. He was a director also in many large financial and industrial operations. He served as major and colonel in the Military Intelligence Division of the United States Army, during the World War.

BIDDLE, WILLIAM PHILLIPS (1853), major general U.S. Army, was born in Philadelphia and educated privately and at the University of

Pennsylvania. In the Pekin Relief Expedition he commanded the marines and he has also commanded the marine barracks at Cavite in the Philippines. In 1903 he served with the expeditionary forces, Isthmus of Panama, afterwards commanding the marine barracks in Philadelphia, Manila, and New York. He retired in 1914. He was awarded the Dewey medal for the Battle of Manila, and also medals for the Spanish War and the Philippine and Pekin relief campaigns. During the World War he was on active service at San Diego, Calif.

BIDEFORD (51° 1' N.; 4° 12' W.), seaport town, on Torridge, N. Devon, England; XIV.-cent. bridge of 24 arches; earthenware. Pop. 9,100.

BIDPAL, FABLES OF, or PILPAY, collection of ancient Hindu stories, which have been trans. into most European languages.

BIEBRICH (50° 2' N.; 8° 14' E.), town, on Rhine, Prussia; castle of Dukes of Nassau, 1744-1840; cement, iron foundries. Pop. 20,000.

BIEL, BIENNE (47° 9' N., 7° 15' E.), town, Swiss canton Bern; N.E. Lake of B.; watch-making, machinery. Pop. 24,000.

BIEL, LAKE OF (47° 5' N., 7° 10' E.), Switzerland; contains island of St. Pierre, Rousseau's residence, 1765.

BIELA, WILHELM, BARON VON (1782-1856), Austrian astronomer; discovered three comets, among them the B. Comet (1826).

BIELA'S COMET, named after Wilhelm von Biela, a German astronomer who, in 1826, first made observations of a comet which had been noticed by other astronomers in 1772 and 1805. It appeared again in 1839 and in November, 1845. On this latter occasion what was regarded as one of the most remarkable phenomena in the history of astronomy was observed to take place; the comet split in two, the tail disappearing while this was taking place. In August, 1852, the larger of the two divisions appeared, and three weeks later the other portion made itself visible. The distance between the two portions being about 1,500,000 miles. This was the last occasion on which this peculiar body, or bodies, was seen. It is surmised that the two portions of the comet broke up into star dust.

BIELEFELD (52° 1' N.; 8° 31' E.), town, on Lutter, Westphalia; centre of Westphalian linen, damask, and bleaching works; machinery. Pop. 80,000.

BIELITZ (49° 50' N., 19° 3' E.), town, on Biala, Austrian Silesia; woollens. Pop. 16,900.

BIELSTI, tn.; N. Bessarabia, Rumania (47° 42' N., 27° 58' E.); bricks, soap, candles; trade in live stock; annexed by Russia (1812); Rumanian by Peace Treaty (1919). Pop. 20,000.

BIERCE, AMBROSE (1842-1914); an American author and journalist, born in Ohio. He served throughout the Civil War and afterwards engaged in newspaper work. He wrote a number of short stories of unusual power and is considered one of the most original and powerful American writers. He disappeared in 1914 and was supposed to have been killed while taking part in the revolution in Mexico.

BIERSTADT, ALBERT (1830-1902); American painter, was born near Dusseldorf, Germany. In 1831 he came to America with his parents and in 1851 first began to paint. He returned to Dusseldorf to study art and spent some time in Italy and Switzerland, returning to the United States in 1857. He accompanied General Lander's expedition to the Rocky Mountains and spent some months studying mountain scenery. In 1861 he finished his painting, *Laramie Pass* and two years later he completed his *View of the Rocky Mountains—Lander's Pass*. These pictures gave him, a national reputation. He was, in addition, the recipient of numerous foreign medals and decorations.

BIESBOSCH (51° 45' N., 4° 45' E.); expanse of water, Holland.

BIFOCAL LENSES, composite lenses composed either of two lenses of different curvatures, or of one lens ground so that a small portion has a curvature differing from that of the remainder, used to correct vision in cases where different corrections must be applied for far and near vision. For example, in aphakia the absence of the crystalline lens of the eye, due either to dislocation, injury or removal by operation a strong convex lens is needed for distant, and a still stronger one for near vision, and the upper portion of the bifocal lens prescribed will have a longer focal length than the small lower portion. In presbyopia, and error of refraction, bifocal lenses are also used.

Bifocal lenses were devised by Benjamin Franklin, who was inconvenienced by constantly having to change his spectacles, for near and far vision. The early bifocals, consisting of two half lenses had a visible line of demarcation between the two pieces of glass. Later a semicircular piece of glass, properly

BIGAMY

ground was cemented on the lower part of a full size lens. This method also left a visible line; in order to remedy this defect, machinery was developed to grind one piece of glass so that the upper and lower portions had different focal lengths.

BIGAMY, the act of a person marrying again during the lifetime of the first wife or husband. In canon law a second marriage, or marriage with one who had been married before, is bigamy.

BIG BETHEL, a village of Virginia, between the York and James rivers, the scene of a battle between the Federalist and Confederate forces on June 10, 1861. The Federal army was defeated with a loss of about 100 men. Major Theodore Winthrop, a promising officer was killed in this engagement.

BIG BROTHER MOVEMENT, an organization for promoting the active personal interest of one man for one boy. Allied with it is the Big Sister Movement, which instills the befriending of a girl by a woman. It was formed in 1904 by a group of forty men and in 1922 had 40,000 members in the United States and Canada. The movement has extended to foreign countries as far as China and New Zealand. It has grown in the schools and in settlement work. The Big Brothers aim at guiding and winning the confidence of boys of unformed or misdirected character who are not reached by other social organizations.

BIGELOW, ERASTUS BRIGHAM (1814-1879), American inventor, was born at West Boylston, Mass. His name is prominent in connection with the early development of the American textile industries, and his inventions include looms for suspender webbing, knotted counterpanes, carpets, etc. He was one of the original incorporators of the Massachusetts Institute of Technology and is the author of *The Tariff Question. Considered in Regard to the Policy of England and the Interest of the United States*.

BIGELOW, FRANK HAGAR (1851) meteorologist, prof. of meteorology in U.S. weather bureau; author of several monographs on the subject.

BIGELOW, JOHN (1817-1911), journalist and diplomatist; edit. of Amer. papers till 1861; minister to France till 1867; Sec. of State for New York, 1867-68.

BIGELOW, JOHN (1854), American soldier, was born in New York city and educated in Paris, Bonn, Berlin, Freiberg and Providence, R. I. He graduated from U.S. Military Academy

BIG SANDY RIVER

in 1877, becoming a second lieutenant in the 10th Cavalry in the same year. For four years he was professor of military science at the Massachusetts Institute of Technology. He took part in the attack on San Juan in 1898, where he was wounded. In 1904 he retired after 30 years' service, and for six years was professor of French at the Massachusetts Institute of Technology. He is author of *Mars-la-Tour and Gravelotte*, *Principles of Strategy*, *American Policy*, and *Breaches of Anglo-American Treaties*.

BIGELOW, POULTNEY (1855), journalist and author, educated in Germany; made acquaintance of Crown Prince, afterwards Emperor William II., and has written books on Germany; celebrated canoe traveler; has written travel books—*Paddles and Politics down Danube*, etc.

BIGHORN (*Ovis montana*), sheep found on Rocky Mountains; reddish-grey color.

BIG HORN MOUNTAINS, a spur or range of the Rockies, running north through the north-central part of Wyoming and terminating in southern Montana. The total length of the range is about 120 miles and the width from 30 to 50 miles. It forms a barrier between the Great Plain on the east and the Bighorn Basin on the west. Some of the most rugged and picturesque scenery in the country is found throughout this region. Among the higher ravines may be found small glaciers, while many of the peaks jut over 10,000 feet above sea-level, Cloud Peak being 13,000 feet in height. The whole region is heavily timbered, the forests here forming part of the national Bighorn Forest Reservation.

BIG HORN RIVER (Mont. and Wyo.), rises in the Rocky Mts., near Fremont Peak, then flows northeast and empties into the Yellowstone River, its total length being about 450 miles, the lower part being navigable for small boats. Along its banks may be found some of the wildest and most beautiful scenery on the North American continent, notable for its picturesque ruggedness.

BIGHT, large open bay (geography); loop of rope (nautical).

BIGOD, HUGH (d. 1177), 1st Earl of Norfolk (1141); 2nd s. ultimately heir of Roger Bigod; made earl for supporting Stephen against Empress Matilda.

BIG SANDY RIVER (W. Va. and Ky.), forms the boundary between West Virginia and Kentucky, after which it

empties into the Ohio River near Huntington, W. Va. Its upper reaches branch out into two forks; Tug Fork, rising in W. Va., and West Fork, rising in Ky. About 100 miles of it is navigable for flatbottom boats.

BIG SIOUX RIVER (So. Dak.), rises in the northeastern part of the state, flows south 300 miles and empties into the Missouri River two miles above Sioux City, Ia.

BIHAR, BEHAR (25° 11' N., 85° 31' E.), town, Bihar and Orissa, India; traditional capital of ancient kingdom of Magadha; has great inn for Muhammadan pilgrims. Pop. 45,000.

BIHAR AND ORISSA (24° N., 86° E.), Indian province (Lieutenant-Governorship), formed 1912 (from parts of Bengal as constituted, 1905); contains Bhagalpur, Patna, Tirhut, Chota, Nagpur, and Orissa divisions. The Ganges traverses the N.; in the centre is hilly country (Parasnath, 4500 ft.); in S. fertile delta and valley of Mahanadi; irrigation by Son and Orissa canals. People are mostly Dravidian and Ayyo-Dravidian. B. produces sugar, maize, rice, wheat, barley, tobacco, opium, cotton, tea; manufactures muslins, carpets, silk, glass, pottery; saltpetre and mica are obtained. Capital is Patna; there is a Legislative Council; area, 113,000 sq. miles. Pop. c. 35,000,000.

BIHARI, one of the four principal Indian languages, the others being Bengali, Assamese, and Oriya. It is spoken by about 35,000,000 people.

BIJAPUR (16° 49' N., 75° 46' E.).—(1) ancient city, Bombay, India; formerly capital of B. kingdom; from Hindus passed through the hands of Muhammadans and Mahrattas, becoming British, 1848; has ruined temples, mosques, palaces; principal building, tomb of Muhammad Adil Shah. Pop. 27,600. (2) district; plain, bordering Nizam's dominions; millet, cotton, silk; area, 5669 sq. miles. Pop. 863,000.

BIJAWAR (24° 38' N., 79° 32' E.).—(1) native state, Central India; forests; area, 973 sq. miles. Pop. 125,200. (2) chief town, B. state. Pop. 6,000.

BIJNOR, BIJNAUR (29° 22' N., 78° 10' E.).—(1) district, United Provinces, India; sugar, cotton, cloth; area, 1791 sq. miles. Pop. 779,900. (2) chief town, B. district. Pop. 17,600.

BIKANER (28° 1' N., 73° 18' E.).—(1) native state, Rajputana, India; mostly sandy and waterless; inhabitants poor; Bikaner Camel Corps saw service in China, 1901, when the Maharajah commanded and in Somaliland, 1904;

camels, horses, cattle; area, 23,311. Pop. 710,000. (2) walled town, capital B. state; Jain temples; pottery, carving. Pop. 60,000.

BIKELAS, DIMITRIOS (1835-1908), a Greek poet and essayist. Educated in London and after 1874 lived in France. First published collection of poems in 1862. Later translated all of Shakespeare's dramas into modern Greek, making a most scholarly and excellent metrical translation. He gained wide popularity as a prose writer as well. One of his stories *Luk is Laras*, published in 1879, has since been translated in more than 10 languages.

BILASPUR (22° 5' N., 82° 12' E.).—(1) district, Central Provinces, India; occupies portion of Chattisgarh plateau; large tract of hilly country to north; principal river, Mahanadi; S. well watered, undulating, thickly populated and cultivated; rice, wheat, timber; area, 7602 sq. miles. Pop. 917,240. (2) capital, B. district, on river Apra. Pop. 18,900.

BILBAO (43° 15' N., 2° 54' W.), chief town of Biscay province, Spain, on river Nervion, 8 miles S.E. of mouth; leading seaport of Spain; exports over four million tons of iron ore annually, mostly to U.K.; imports coal; unsuccessfully besieged by Carlists, 1835 and 1874. Pop. 92,500.

BILBEIS, BELBEIS (30° 25' N., 31° 30' E.), town, lower Egypt, E. arm of Nile.

BILBERRY, BLAEBERRY, WHORTLEBERRY (*Vaccinium myrtillus*), small shrub with ovate leaves and purple edible berries, growing in N. temperate and arctic zones.

BILBILIS (41° 25' N., 1° 39' W.), ancient town, Spain.

BILDERDIJK, WILLEM (1756-1831), Dutch poet; pub. collections of love songs in 1781 and 1785; an epic, *Elias* (1786); a didactic poem, *The Disease of the Learned* (1807); a tragedy, *Floris V.*, etc.; described by Ten Brink as 'the cleverest verse-maker of the XVIII. cent.'

BILEJIK (40° 7' N., 30° 3' E.), town, vilayet Brusa, Asia Minor; silk. Pop. 10,000.

BILGE, lowest internal part of ship's hull. Bilgewater collects there.

BILHARZIOSIS, disease, occurring in Africa, caused by the presence of the ova and embryos of a parasite, *Bilharzia hoematobia* (*Schistosoma hoematobium*) in the blood-vessels of the mucous mem-

brane of the bladder and urinary passages; the parasites are supposed to enter the body either by the rectum or urethra when bathing in infected water, or by swallowing infected food or drink.

BILL (Med. Lat. *billā*, from Lat. *bullā*, any circular or cylindrical object like seal or roll).—(1) **B. OF PARLIAMENT**, see Acr. (2) **B. OF ATTAINDER** (q.v.), (3) Beak of a bird and other animals. (4) Pruning instrument of husbandman with blade curved like bird's b. (5) Military weapon of similar shape used from O.E. times to XVIII. cent. (6) Letter, as in B. of Coats (solicitor's account), B. of Credit, B. of Exchange, B. of Health (certificates furnished to shipmaster by authorities of port from which he sails).

BILL OF EXCHANGE, an order in writing addressed by one person to another for the payment of a certain sum of money at a certain time, without condition or restriction; may be made payable either at home or abroad.

BILL OF RIGHTS, which became Act of Parliament, 1689, enforcing, among other enactments, the Prot. religion on Eng. sovereigns, declaring William III. and Mary II. King and Queen of England, and setting forth chief liberties or 'rights' of subjects.

BILL OF SALE, a deed by which the ownership of personal chattels, but not the possession thereof, is transferred from one person called the grantor to another person called the grantee.

BILLAUD-VARENNE, JACQUES NICOLAS (1756-1819), Fr. Jacobin; most bloodthirsty member of Committee of Public Safety; insisted on execution of Marie Antoinette; deported for cruelty, 1795.

BILLET, architectural ornament shaped like small cylinder, placed at regular intervals along cornice.

BILLETING, quartering of soldiers in private houses.

BILLIARDS, a table game, the origin of which is lost in obscurity; mentioned in will of a II.-cent. Irish king; referred to in Shakespeare's *Antony and Cleopatra*, mentioned by Spenser, and was the fashionable game in France during the reign of Louis XIV.

BILLINGS, a city of Montana, the county seat of Yellowstone co. It is on the Northern Pacific, the Great Northern and other railroads, and on Yellowstone River. It is the center of an important stock raising region and is one of the largest wool markets in the United States. Its industries include flour and lumber mills, beet sugar

factories, etc. There are many important public buildings including a public library and a court house. Pop. 1920, 15,100.

BILLINGS, JOHN SHAW (1839-1914), was born in Switzerland co., Ind., and was educated at Miami University and the Medical College of Ohio. He later became demonstrator of anatomy at the latter institution, and during the Civil War served as surgeon in the U.S. Army. He later became medical inspector in the Army of the Potomac. He then was placed in charge of the library of the surgeon general's office until appointed curator of the Medical Museum and Library, retiring in 1895. He was in charge of the vital statistics of the 10th Census and the 11th Census, and was director of the New York Public Library.

BILLINGS-GATE, London fish-market, held by Thames in B. a little above Tower; licensed, 1699; variety of Cockney spoken here is noted for freedom and expressiveness.

BILLINGTON, ELIZABETH (d. 1818), Eng. prima donna; wife of James B., a double-bass player; achieved great success in Ital. opera at Convent Garden and Drury Lane, and at Florence, Venice, and Milan.

BILLINGTON (2° 55' S., 108° E.), island, Dutch East Indies, between Sumatra and Borneo; surrounded by rocks and islets; tin; area, 1863 sq. miles. Pop. 37,900.

BILLON (Fr. debased coin), heavily alloyed metal used for medals and coins.

BILLROTH, ALBERT CHRISTIAN THEODOR (1829-94), Ger. surgeon; prof. of surgery at Zürich (1860) and Vienna (1867); was made a member of the Austrian House of Peers (1887); one of the greatest surgeons of his time, introduced many new methods of operation.

BILOXI, a city of Mississippi, in Harrison co. It is on Biloxi Bay and on the Louisville and Nashville Railroad, 80 miles east of New Orleans. Its important industries include the canning of oysters, fishing, fruits and vegetables. The city is the site of the first settlement made near the Mississippi by white men, under the direction of d'Iberville, in 1699. It is a favorite summer and winter resort. Pop. 1920, 10,937.

BILSTON (52° 24' N., 2° 5' W.), market town, Staffordshire, England; coal, iron. Pop. 25,700.

BILTONG, sun-dried strips of meat (S. Africa).

BIMANA, term once used to distinguish man from *Quadrumana* (monkeys).

BIMETALLISM, employment of mixed currency, gold and silver, as legal tender of a country; in Britain monometallic system is in force, gold being recognized legal tender; it is contended that ratio (about 16 to 1) should be fixed between two metals, and that less fluctuation in prices of metals would result; open to objection that scheme was tried in France with little success; free coinage of silver suspended by Paris Mint, 1873. In U.S. gold has been standard since (nominally) 1873. Bland Silver Bill (1878), a compromise, provided for monthly silver coinage of from \$2,000,000 to \$4,000,000; Sherman law (1890) provided for monthly purchase by Treasury of 4,500,000 oz. of silver and issue of Treasury notes for it—notes and silver were full legal tender; purchase abandoned, 1893. Presidential bimetalism candidate was defeated (1896), and with Currency Law (1900) and general introduction of gold standard, bimetalism died as a popular cause.

BINARY ENGINE, an engine driven by two working fluids, as steam and ether. In this case the exhaust from the steam cylinder passes into a surface condenser, where it is condensed. At the same time the more volatile ether evaporates, the vapor of which passes into and works a second cylinder. It is then passed into a second condenser where it is again reduced to a liquid. The object of a binary engine is to increase the range of temperature between which a heat engine may work.

BINARY NOMENCLATURE, application of a generic together with a specific name for plants and animals, e.g. *Callia palustris* (marigold).

BINARY (OR DOUBLE) STARS, which to the naked eye may appear single, but through the telescope reveal themselves as double. Over 20,000 have been located and tabulated. The majority of these are what are known as "optical pairs;" that is, though apparently close together, one is perhaps millions of miles nearer or further in space. Some hundreds of them, however, are now definitely known to be true double stars, revolving around a common center of gravitation, as the moon revolves around the earth. The orbits of about 60 have been closely studied, some making their revolutions in a little over five years, others in a period estimated as high as ten centuries. Some are so distant that their motions can

only be studied through their spectra, the duplication of lines in the spectra indicating the rate of their mutual revolutions.

BINARY SYSTEM, double stars revolving around each other.

BINARY THEORY, in chemistry, a hypothesis regarding the construction of salts, first proposed by Davy. The assumption is that all salts contain merely two substances, or two elements; a basis, or electropositive, which may be a metal, or a radical and an acid, or electro positive element, or radical. Or, in simpler terms, that all salts contain merely two substances, which either are both simple, or of which one is simple, and the other a compound, playing the part of a simple body. The old illustration is common salt, or chloride of sodium, which is constructed of the metal sodium and the non-metal, chlorine, and is at a glance seen to be a binary (or double) compound. In like manner, fluor-spar, or the fluoride of calcium, consists of the metal calcium and the non-metal fluorine.

BINCHE (50° 24' N., 4° 9' E.), town, Belgium. Pop. 12,000.

BINDING MACHINES.—Any mechanical device for applying a band or binding, particularly an attachment on reaping or harvesting machines for tying the grain in sheaves may be designated as a binding machine.

The development of the binder as applied to reaping machines made possible the automatic operation of a machine which could successfully and cheaply handle a crop covering a large area. By making possible an enormous reduction in the labor necessary to handle a given harvest, its influence on the economic development of the West can hardly be overestimated. John E. Heath, of Ohio, in 1850, conceived and patented the first twine or cord binder for sheaves. His idea was soon improved upon by numerous others, among whom was J. F. Appleby, the designer of a very successful cord binder. Many patents filed about this time, used cord, straw and wire as the binding material. Most of these, however, were subsequently improved, and the originals are now obsolete. The knotting mechanism of Jacob Bhel, an inventor of this period, is in use at present, with slight modifications.

The use of machinery for the binding of books, shares with printing the responsibility for the decrease in the price of books, thus bringing them within the means of the average person, and making possible their production and sale in quantity.

Owing to the fact that books bound by hand are much more durable, this older method is still used for the more expensive books.

The various familiar devices used for fastening papers together, although not marketed under that name, may be listed as binding machines. Some of these pierce the paper with small pieces of sheet metal, binding the folded ends. One ingenious device makes a U-shaped cut in the paper and folds the loose pieces over, tucking the end through a slit made over the horseshoe cut; thus the paper itself acts as binder.

BINET, ALFRED (1857). Fr. psychologist; director of physiological psychology at the Sorbonne; an eminent experimental psychologist; roused much keen discussion by his 'Metrical Scale of Intelligence.'

BINET-SIMON TESTS. See **PSYCHOLOGY**.

BINGEN (49° 57' N., 7° 54' E.), manufacturing and trading town, on Rhine, Hesse, Germany; wine; in the middle of the river stands the famous Mouse Tower, where according to legend, Abp. Hatto was destroyed by mice. Pop. 10,000.

BINGHAM, HIRAM (1875), explorer, was born at Honolulu, the s. of the late Rev. Hiram Bingham. He was educated at Yale, the University of California, and at Harvard. He became preceptor in history and politics at Princeton and in 1907 started his career as explorer by following Bolivar's route across Venezuela and Columbia. He was afterwards appointed lecturer on South American geography and history at Yale University, and later assistant professor and then of Latin American history. He was the United States delegate to the first Pan - American Scientific Congress at Santiago de Chile. He later explored the Spanish trade route from Buenos Aires to Lima and was the director of the Yale Peruvian Expedition in 1911, when he located the site of Vitcos, the last Inca capital, and made the ascent of Mount Coropuna. He has directed Peruvian expeditions under the auspices of Yale University and of the National Geographical Society. His published works include *Journal of an Expedition Across Venezuela and Columbia*, *Across South America*, *Vitcos, the Last Inca Capital*, *The Monroe Doctrine an Obsolete Shibboleth* and he has also contributed a large number of articles to various scientific and literary periodicals. During the World War he learned to fly and was

ordered on active duty in 1917 with the Aviation Section.

BINGHAM, JOSEPH (1668 - 1723), Eng. clergyman; Fellow of Univ. Coll., Oxford, of which position he was deprived on a charge of heresy; pub. a valuable antiquarian work, *Origines Ecclesiasticae* (1708-22).

BINGHAMTON, a city of New York, the county seat of Broome co. It is on the Chenango and Susquehanna rivers at their junction, and is on several important railroads. The city is more than 850 feet above tidewater and the river is spanned by eight bridges. There are excellent street sewer and water systems. The public buildings include libraries, hospitals and banks. There are also several handsome parks. The city is the site of the State Asylum for Insane, the United States Government Building, State Armory and has orphan asylums. Its most important industries include the manufacture of boots and shoes, motors, cigars, cotton goods and clothing. A notable feature of the city is the large number of cottages owned by working people. Binghamton became a city in 1867. Pop. 1920, 68,800; est. 1924, 75,000.

BINGLEY (53° 51' N., 1° 50' W.); market town, W. Riding, Yorkshire; woolen goods. Pop. 18,800.

BINMALEY (16° 5' N., 120° 18' E.); town, Luzon, Philippine Islands; rice, salt. Pop. 16,400.

BINNACLE, covered stand for compass on ship.

BINNEY, HORACE (1780 - 1875), leading American lawyer and politician.

BINOMIAL, algebraical expression composed of sum or difference of two quantities. For expansion, see **ALGEBRA**.

BINTANG (1° 10' N., 104° 30' E.), island, Malay Peninsula.

BINTURONG (*Arctitis binturong*), nocturnal civet-like carnivorous animals of E. Ind. forests.

BINYON, LAURENCE (1869), English author and Deputy Keeper in the British Museum, in charge of sub-department of Oriental prints and drawings, was born in Lancaster, England. He was educated at St. Paul's School and at Oxford, where in 1890 he won the Newdigate Prize. He entered the service of the British Museum in the Department of Printed Books, and two years later was transferred to the Department of Prints and Drawings, later becoming assistant keeper. In 1912 and 1914 he was a Lowell lecturer in the

United States. He is the author of numerous books and poems, amongst them being *The Praise of Life*, *Western Flanders*, *Court Painters of the Grand Mogul*, etc.

BIOCHEMISTRY. That branch of chemistry which studies the reactions occurring on the living cell. The chemical changes which take place in living matter, whether of animal or vegetable origin, form a perpetually recurring cycle, in which organic matter is first built up from inorganic matter, and in turn is broken down to inorganic. From water, mineral salts, and the carbon dioxide of the air, the plant builds up carbohydrates, fats and proteins. The plant is eaten by an animal and the vegetable tissue is converted into animal tissue. When the animal dies, the body decays, and by bacteriological action is again converted into simpler constituents from which the original plant was built. These constituents are utilized for plant food, once again, and the cycle is repeated. The biochemist studies the mechanism by which this cycle operates. The building up of carbohydrates (sugar, starch, etc.) from water and carbon dioxide has been closely followed and the important part played by chlorophyll has been demonstrated. The process takes place by what is known as *photosynthesis*, or building up by means of light. When a plant is kept in the dark, the leaves turn white because no chlorophyll is formed. When it is brought into the light chlorophyll is first synthesized. When a sufficient quantity has been produced further manufacture ceases, and the chlorophyll then becomes an agent for transforming carbon dioxides and water into starch and sugar. The process has been artificially brought about in the laboratory by subjecting solutions of carbon dioxide in water to the action of ultra-violet light in the presence of chlorophyll and other green coloring matter. In this manner, formaldehyde and some simple forms of sugar have been synthesized, but sucrose, or cane sugar, has not yet been artificially produced.

Biochemistry is not concerned only with the chemical changes occurring in the cells of the plant. It seeks to elucidate the complicated reactions occurring continually in the animal body. The digestion of food, the absorption of the products of digestion by the blood, the whole process of nutrition are all fundamentally chemical in their nature. Respiration is a process of oxidation, in which the body introduces oxygen into the system, breaking down the products of digestion into water and

carbon-dioxide, and thereby providing energy for the body's use. The functioning of the liver and kidneys, the changes brought about in these organs, the products of secretion, and the effect of disease upon such products, also form an important part of the biochemist's studies. Even the more obscure manifestations of animal activity, anger, love, hatred, pleasure, sexual impulses and others which are classed as psychological, are all accompanied by marked chemical changes, but whether the changes are the product or the cause of the manifestations still remains a matter of dispute. Among the more important of recent advances in biochemistry may be mentioned the investigation of hormones and the discovery of vitamins.

BIOGRAPHY (Gr. *biographia*, from *bios*, 'life', *graphein*, 'to write'), history of a person's life. One of the earliest forms of literature, the epic poem, takes the shape of biography; long after close of Homeric age, authors such as Æschylus, Sophocles, and Euripides treated their characters as subjects of biography, not legend, and as such they were considered by the audience; pure biography was developed both in Greece and Rome. The Gr. historian Plutarch (c. A.D. 45-c. 125) set model of biography in his *Lives of Illustrious Greeks and Romans*, which was trans. into French by Amyot (1513-93), turned into class. English (1579) by North, and became the groundwork of Shakespeare's class. plays.

In the Middle Ages mystery and miracle plays were intended to be biographical, as were also the various rhyming histories of the saints. The biography, as we know it, began to be written in the 16th cent., when Cavedish wrote famous *Life of Wolsey* and William Roper penned a life of his father-in-law, Sir Thomas Moore. Notable Eng. biographies are: in the 17th cent. Fuller's *Worthies of England*, Izaak Walton's lives of Donne, Wotton, Hooker, Herbert, and Sanderson, the *Athenae Oxoniensis* of Anthony à Wood; in the 18th cent. Dr. Johnson's *Lives of the Poets* (1779-81), important in the history of criticism, Godwin's *Life of Chaucer* and *Lives of the Necromancers*, and (1791) Boswell's *Life of Dr. Johnson*.

Nearly everybody of importance has been the subject of a biography since beginning of 19th cent.; among outstanding biographies in English are Lockhart's *Scott*, Southey's *Nelson*, Coleridge's *Biographia Literaria*, Thomas Moore's *Life of Byron*, Carlyle's studies of *Burns*, and other small masterpieces

in the *Essays*, greater than his *Frederick* and other larger biographies, Froude's *Bunyan*, Eng. Seamen, Carlyle, etc., Scaliger's *Milton* (1879), Sellar's *Roman Poets* (these have their counterparts in France in books of Boissier), the various biographies by Lord Morley, notably his *Gladstone* (1903), Winston Churchill's *Life of Lord Randolph Churchill*, W. Ward's *Cardinal Newman*, Cabot's *Emerson*, Lounsbury's *James Fenimore Cooper*, Paine's *Mark Twain*, Trevelyan's *Macaulay*, Sir Leslie Stephen's *Henry Fawcett*, Dowden's *Shelley*, Sir Sidney Lee's *William Shakespeare*, Sir E. T. Cook's *Ruskin*, W. F. Monypenny's and G. E. Buckle's *Disraeli*, Prof. Harper's *William Wordsworth*, and Garvin's *Joseph Chamberlain* (1920). Works on national biography—(e.g.), *Dictionary of National Biography*, *Cyclopedia of American Biography*, and *Allgemeine Deutsche Biographie*—have been compiled in many modern countries.

BIOLOGY, life-lore; the description of all the phenomena of what is called life falls within its scope. For practical purposes, however, it is convenient to delimit this branch of science by excluding the study of human beings, except in so far as comparison and relation with other living organisms is concerned. Biology is, therefore, the comparative description of the structure, functions, distribution, and evolution of animals and plants, the more particular study of each being the function of the sciences of Zoology and Botany respectively.

BIOMETRY. The statistical investigation of biological observations. A school of thought has arisen, in recent years, among biologists, which insists on the importance of quantitative measurements, especially in connection with observation regarding heredity and evolutionary processes in general. In the words of Professor Karl Pearson, one of the leading exponents of the school, 'biology requires the help of a more exact logic than it appears to possess, above all of an adequate statistical theory to enable it to interpret its observations and test its own theories.' Biometricists criticize much of the work of fellow biologists on the ground that they are too closely concerned with qualitative variations, while ignoring the quantitative aspect of the matter, thereby arriving at conclusions which can often be shown to be erroneous by a careful statistical study of the observations on which those conclusions are based. To illustrate this point by a simple instance, the statement that one race is characterized by long heads, and another by round heads is instantly challenged by the biometricist, who in-

sists upon numbers and percentages. To give another example, they point out that definite statistics regarding fertility are of supreme importance in examining the theory of the survival of the fittest, because the number of offspring of any particular type must affect the question of the perpetuation of that type, regardless of whether or not the characteristics of that type were such as to make it the best fitted to survive. Similarly, the study of correlation between death-rate and environment, and between somatic characters and death-rate they claim to be vital to further progress in solving the problems of evolution, and such study can best be pursued along statistical lines. Their attitude has been much criticised by other biologists, who claim that they attach more meaning to their statistics than they can legitimately bear.

BION (c. 100 B.C.), Gk. bucolic poet, whose best-known poem is the *Lament for Adonis*.

BIOT, JEAN BAPTISTE (1774–1862), Fr. physicist, prof. of Math's at Beauvais afterwards prof. of Physics at Collège de France, and of Physical Astron. at Faculté des Sciences; invented polarimeter; pub. researches on polarized light, astron., physics, and other subjects. *Edouard Constant B.*, his s. (1803–1850), authority and writer on Chinese affairs.

BIOTITE. A species of mica, known as magnesia mica to distinguish it from potash or muscovite mica. It consists of a compound silicate of aluminum, iron, magnesium and potassium, and occurs in different varieties of which meroxene, found in volcanic deposits, is the most important. Other varieties are lepidomelane, rubellane, voigtite and phlogopite. Biotite is usually dark brown or black in color and is transparent only in thin laminae. It is denser than muscovite and less elastic. It is frequently found associated with muscovite in granite and other minerals, the two micas being intimately mixed. Meroxene is found in the neighborhood of Mt. Vesuvius. Rubellane is a red mica, also found in volcanic rocks, and almost entirely lacks elasticity. Lepidomelane is black and is slightly magnetic, probably due to the fact that it is rich in iron.

BIPARTITE, of two leaves separated at base (bot.); of curve with two branches (math's); b. factor, quantity which, when squared, exactly divides another quantity.

BI-PLANE. See AERONAUTICS.

BIQUADRATIC, fourth power of a

quantity; equation in which highest power of unknown is b.

BIQUINTILE, two-fifths of circle (144°).

BIR, BIREJIK (36° 59' N., 38° 3' E.), town, on Euphrates, Asiatic Turkey. Pop. 10,600.

BIRBHUM (24° 5' N., 87° E.), district Bengal, India; capital, Suri; silk; area, 1752 sq. miles. Pop. 1,000,000.

BIRCH (*Betula*), genus of hardy trees and shrubs of N. temperate zone to 70° N., *B. alba* being the common species, forming large forests in Russia; has a silvery cuticle, easily peeled, small irregularly serrated leaves, and the fruit has membranous wings to assist its dispersal. The bark (from which an oil is obtained), wood, and sap are applied to various uses.

BIRCH, CHARLES BELL (1832-93), Eng. sculptor who executed many public works, including griffin at Temple Bar.

BIRCH, THOMAS (1779-1851), an American painter, born in London. Until 1807 he devoted himself to portrait painting. In that year he began painting marine scenes in which he achieved a high reputation. He painted several naval battles of the War of 1812, notably of the engagement between the *Constitution* and the *Guerriere*.

BIRD, CHARLES (1838-1920), U.S. Army officer, was born in Wilmington, Delaware and educated at Lawrenceville (N.J.) School. He became a first lieutenant in the 1st Delaware Infantry, and in 1867 won promotions 'for gallant and meritorious services in battle of Fredericksburg, Va.' and for the same in the battle of Spotsylvania, Va. In 1902 he was retired by operation of the law.

BIRD, WILLIAM (BYRD) (1563-1623), Eng. musical composer; wrote first Eng. madrigals (1588.).

BIRD-LICE (*Mallophaga*), neuropterous, biting insects, parasitic on skin, hair, and feathers; different from true lice (*Rhyncrota*).

BIRD RESERVATIONS, AUBUBON. See **AUDUBON BIRD RESERVATIONS.**

BIRDS (*Aves*), a class of highly specialized vertebrate bipeds of world-wide distribution, characterized by their intense metabolism, indicated by high body temperature, by numerous anatomical adaptations for the function of flight, by the possession of feathers, and by the hatching of their young from eggs with calcareous shells.

The extinct Arch *Æopteryx* forms the sub-class Archæornithes or Saururæ. All other birds are included in the sub-class Neornithes.

The first division of the latter, Ratitæ, running birds without power of flight, persisting since the Miocene, with keelless breastbone, are represented by the ostrich (*Struthio*) of Africa and Arabia, the S. Amer. ostrich (*Rhea*), the Australian emu (*Dromoeus*) and Australian-Malayan cassowaries (*Casuarus*), the little wingless and four-toed kiwi (*Aperteryx*) of New Zealand and its extinct giant relative, the moa (*Dinornis*), the recently extinct order *Æpyornis* of Madagascar, and various Eocene and Pleistocene species.

The second division, Odontolæ, consists of extinct swimming birds with keelless breastbone and teeth situated in grooves, and a few affinities to living flying types. *Hesperornis* of N. America and *Enaliornis* of English cretaceous strata are the typical representatives.

The flying birds with keeled breastbone are comprised in the third division, Carinatæ. Their principal adaptations for flight are the general shape of the body, offering comparatively little resistance to the air; the construction of the wings; the keeled breastbone for the attachment of the powerful pectoral muscles; the air-spaces in the body cavity and in the long bones in connection with the non-expandible lungs, and the air in spongy spaces in the skull-bones connected with the Eustachian and nasal tubes, facilitating breathing during flight. Many birds undertake long and hazardous migratory flights to ensure a supply of food when the climatic conditions make a sojourn in the breeding area prohibitive. The remarkable development of the brain, manifesting itself in the complex emotions of courtship, and all the functions associated with the care of offspring (e.g., nest-building), and in migration and other habits, makes some orders of the Carinatæ rank with the mammals, and thus with the highest evolutionary phases of the animal kingdom.

A segregation of Carinatæ, over 11,000 species into 14 orders, introduced by Dr. Gadow, seems most advantageous. The extinct (cretaceous) *Ichthyornithes* have biconcave vertebrae and teeth in sockets, and were able to fly well. The aquatic *Colymbiformes* with straight bill include the grebes and divers. In the penguins, or *Sphenisciformes*, the wings are transformed into flippers for swimming. Flying seabirds like albatrosses and petrels belong to the order *Procellariiformes*; the gannets, cormorants, frigate-birds, and pelicans, however, as well as wading birds like storks,

ibises, and flamingos, are grouped as Ciconiiformes. Screamers, ducks, geese, and swans are included in Anseriformes. The Falconiformes are diurnal birds of prey and excellent fliers, and include falcons, hawks, eagles, vultures, condors, and others. Of the small Central and S. Amer. order Tinamiformes, the tinamou, a partridge-like game-bird, is the best known representative. Fowls, pheasants, quails, and similar birds constitute the order Galliformes, with the curious hoatzin of Northern S. Amer., whose unhatched chick has clawed fore-limbs, showing reptilian affinities. Wading birds, like cranes, rails, bustards, and bitterns, are Gruiformes. The large order Charadriiformes includes such different types as plovers, pigeons, auks, and gulls, and the extinct dodo of Mauritius. Parrots and cuckoo-like birds belong to the Cuculiformes. A large order with most varied representatives is the Coraciiformes, comprising ravens, owls, humming-birds, toucans, woodpeckers, kingfishers, and others. The most heterogeneous order of all is the Passeriformes, in some of which the emotional life finds its most highly developed and beautiful expression; it includes the birds of paradise, bower, weaver, and tailor birds, and all the singing birds like finches, thrushes, nightingales, etc.

BIRD'S-EYE, flower with bright centre, as germander speedwell and mealy primrose—there is popular superstition against picking it; cut tobacco, including ribs of leaves; nodules in planed timber.

BIRD'S - NEST, name applied to plants of different kinds which live as concealed parasites of others.

BIRDS OF PARADISE (*Paradisaeidae*), closely allied to crows, inhabiting New Guinea and Malay Archipelago; magnificent plumage of adult males evolved by sexual selection; females have plain plumage for protection.

BIRDWOOD, SIR WILLIAM RIDDELL (1865), Brit. soldier; educated Clifton Coll. and Sandhurst; served in several Ind. expeditions and S. African War, and was military secretary to Lord Kitchener. He won fame in the Gallipoli Campaign (1915) as the 'hero of Anzac,' and commanded the Australian and New Zealand Army Corps, and later the 5th Army in France. He received a baronetcy and grant of \$10,000 (Aug. 1919).

BIREN, ERNST JOHANN VON (1687-1772), favorite of Anne, Empress of Russia; s. of peasant called Bühren; took name and arms of Ducs de Biren; made Duke of Courland, 1737.

BIRETTA (Ital. *berretta*, a cap), square cap of different colors according to rank (white for the pope, red for cardinals, purple for pb's, black for lower clergy), worn on certain occasions by R.C. ecclesiastics. The name first appears in XIII. cent., but shape and significance fixed in XVI. and XVII. cents.; considered sign of Erastianism when worn by Anglican clergy in XVII. cent. The use has been revived in modern (ritualistic) Anglican Church, but was declared illegal, 1871.

BIRGEND (32° 53' N., 59° 10' E.); town, Khorassan, Persia. Pop. c. 20,000.

BIRGER, JARL OF BJALÖ (d. 1266), Swed. statesman and legislator.

BIRKBECK, GEORGE (1776-1841); Eng. physician; prof. of Natural Philosophy at Andersonian Institution, Glasgow (1799); founded Mechanics' Institute, London (1823), afterwards called *B. Institution*, of which he was director; it has day and evening classes in science, lit., and arts.

BIRKDALE (53° 37' N., 3° W.); town, Lancashire, England. Pop. 19,000.

BIRKENFELD (49° 38' N., 7° 10' E.). —(1) town, capital of B. principality, Germany; breweries. (2) principality dependent on grand-duchy of Oldenburg (*q.v.*); hilly, well-wooded; agriculture; area, 312 sq. miles. Pop. 50,500.

BIRKENHEAD (53° 24' N., 3° 1' W.); seaport, Cheshire; has ferry, and tunnel under Mersey connecting it with Liverpool; became borough in 1877; large shipbuilding works, iron foundries; splendid docks, first of which was opened 1847; exports coal, etc.; three public parks; fine public buildings, including town hall, library. Pop. 150,000.

BIRKENHEAD, LORD FREDERICK EDWIN SMITH (1872), 1st Viscount, Lord Chancellor of Great Britain in 1919; educated Birkenhead School and Wadham Coll., Oxford; called to bar at Gray's Inn (bencher, 1908), and joined northern circuit; Conservative candidate for Scotland Div. of Liverpool (1903-4); elected for Walton Div., Liverpool (1906), which he continued to represent until 1919; prominent in the Ulster movement against Irish Home Rule (1914); knighted on becoming solicitor-general (1915); attorney-general (1915-19); baronet (1918). During the World War he was administrator of the Press Censorship, and later saw service in France with the Indian Corps. Author of several books on international law, *My American Visit* (1918), *The Indian Corps in France* (1918).

BIRMINGHAM, a city of Alabama, the county seat of Jefferson co. It is at the junction of several important railroads and is 96 miles northwest of Montgomery. Birmingham is at the foot of Red Mountains, which contains large veins of iron ore and great limestone deposits. There are also in the neighborhood several large coal fields. These natural resources have made Birmingham within recent years, the most important manufacturing city in the South. Nine railroad systems serve it, and it is in the heart of coal fields which have an estimated supply of nearly 7 billion tons. There is an excellent school system which includes 60 elementary schools and 5 high schools besides several institutions for higher education. The city has the commission form of government. Pop. 1920, 178,270.

BIRMINGHAM, city, munic. parl., and co. bor., Warwickshire, England (52° 28' N., 1° 54' W.), with suburbs extending into Staffordshire and Worcestershire; the greatest Midland manufacturing town, 97½ m. S.E. of Liverpool, 112 m. by rail N.W. of London.

Town is irregularly laid out; some fine streets and public buildings near center, including town hall, of Gr. arch. with Corinthian pillars, where triennial musical festivals are held, art gallery, council house, etc. Univ. was established in 1900, and there are various other educational institutions, including technical school, school of art, and grammar school founded and endowed by Edward VI. Birmingham is bishopric of Anglican, and an archbishopric of R.C. Church; cathedral built in 1839-41. There are several large hospitals and charitable institutions; numerous statues. Municipal administration (lord mayor) very active and progressive.

Town was in existence before Norman Conquest, and is mentioned in *Domesday Book*; it later gave its name to resident family, who held manor here for about three centuries; supported Roundheads in Civil War; suffered attack by Prince Rupert, who captured and sacked it; in reign of Charles II. was ravaged by the plague. Serious riots have thrice occurred, against Unitarians in 1791, in favor of Chartists in 1839, and against Irish in 1866; enfranchised in 1832; became city in 1889; was the stronghold of the Tariff Reform movement, dominated by the personality of Joseph Chamberlain, who had the chief share in the development of modern Birmingham. Manufactures include all kinds of metal work, founding, rolling, stamping, plating, drawing; making of machinery, iron roofs, girders, gasometers; steam, gas and hydraulic engines; railway plant, electric

apparatus, tools, guns, rifles, bells, electroplate, watches, clocks, glass, chemicals, ammunition, swords, jewelry, coins, buttons, buckles, lamps, toys, pins, steel pens, nails, screws, locks. At the gun proof-house about 600,000 gun barrels are tested annually. Supplied large quantities of munitions during World War. Railways run in all directions; canals to Severn, Thames, Mersey, and through Potteries to Trent. Pop. 840,200.

BIRNEY, DAVID BELL (1825-1864), American army officer, was born at Huntsville, Ala., and educated at Andover, later studying law in Cincinnati. He began to practise in Philadelphia in 1848, and remained there for several years. At the outbreak of the Civil War, he entered the Union as lieutenant-colonel of the 23rd Pennsylvania Infantry. He served throughout the Peninsula campaign and greatly distinguished himself at the battles of Yorktown and Williamsburg as well as at the second battle of Bull Run and the battles of Fredericksburg and Chancellorsville. He commanded the 3rd Army Corps during part of the battle of Gettysburg.

BIRNEY, JAMES GILLESPIE (1792-1857), reformer and political writer; procured enactment by Alabama government of statute forbidding importation of slaves, 1827; settled in Kentucky for anti-slavery crusade, 1833; made New York his center, 1837.

BIRNEY, WILLIAM (1819-1907), American lawyer, was born in Madison County, Alabama, and educated in Paris where he took part in the Revolution of 1848. He was appointed professor of English literature in the college of Burges, France, and in 1861 he entered the U. S. army as a private, being promoted through all grades until he reached that of brevet major-general. He drilled the colored troops and freed the inmates of the slave prisons in Baltimore. In 1874 he moved to Washington, D. C., where he became an attorney for the District of Columbia. His works include *Life and Times of James G. Birney*, and *Plea for Civil and Religious Liberty*.

BIRON, ARMAND DE GONTAUT, BARON DE (1524-92), Fr. soldier and favorite of Henry III.; grand master of Artillery (1569); marshal of France (1576); joined Henry of Navarre (1589); killed at siege of Epernay (July 26, 1592).

BIRON, CHARLES DE GONTAUT, DUKE OF (1562-1602), Fr. admiral and marshal known as (Fulmen Gallicus); finally beheaded for treason.

BIRE, PARSONSTOWN (53° 7' N., 7° 54' W.), market town, King's County, Ireland; castle granted by James I. to Lawrence Parsons, ancestor of Earl of Rosse, present proprietor.

BIRRELL, AUGUSTINE, RT. HON. (1850), Eng. barrister, essayist, and Liberal politician; Quain prof. of law, Univ. Coll., London (1896-9); entered Parliament (1889); president of Board of Education (1905); brought in Education Bill, which was abandoned; secretary for Ireland (1907-16); under his régime Irish Univ. Act, Irish Land Act, and Home Rule Act, were carried; resigned on outbreak of Dublin rebellion (Easter, 1916); Lord Rector Glasgow Univ. 1911. A witty speaker, notable for 'birrellisms'; an essayist of delightful style; author of *Obiter Dicta* (1st and 2nd series), *Men, Women and Books*, *Life of Charlotte Brontë*, studies of *Hazlitt* and *Marvell*, *In the Name of the Bodleian*, and *Frederick Locker-Lampson* (1920).

BIRTH, the act of being born, or bringing forth a child. A mature child at b. is, on an average 18 in. in length, and 6 to 7 lb. in weight, but quite normal infants may differ widely from these figures.

BIRTH CONTROL, a movement of recent growth aiming at family limitation in the interest of society at large and specially aiming at improving living conditions among the poor. A number of Birth Control Leagues have been formed in leading centers of the country to enlighten their communities as to the real meaning of the movement. Its leaders insist that it is not a subject that should be tabooed nor its adoption be regarded as violating moral or statutory laws. Free speech became involved in developing the movement and attempts have been made to suppress meetings by the police, a notable instance occurring in New York in 1921. The movement seeks to present the subject as one that serious and healthy minded people can consider without regarding it as objectionable. Birth control is held to be of great benefit to the poor, who generally have families far in excess of the ability of the parents adequately to support them. As a measure of health it has been urged for birth control that it would be a needed restriction to the fecundity of the underfed, badly housed, tuberculosis, degenerate, alcoholics, and the mentally defective. Children of such people, especially the tuberculosis, come into the world with a lowered vitality, having an inheritance of physiological poverty. Joined with a high birth rate of such classes is a high child mortality,

which it is maintained would be appreciably reduced by family limitation. In illustration of these arguments, Holland is pointed to as a country where teaching by the medical profession of the most hygienic methods of birth restriction has enabled the Dutch poor to have small families which they can raise to be better equipped, physically and morally, than formerly. In Australia and New Zealand free speech on birth control is reported to be general, the means of artificial restriction being widely circulated and the control of family numbers widespread. In the United States public opinion has not yet ripened on the subject in face of legal and religious vetoes placed upon it. In New York the establishment of birth clinics and the dissemination of contraceptives and birth control information have been held as violating the State penal code. In eighteen other states there is no law forbidding the giving of contraceptive information verbally, but such information under federal law is not mailable. The movement has long spread over Europe, represented by national bodies and is developing in Latin America.

BIRTH RATE, or statistics of birth which, together with statistics of marriages and deaths, constitute 'vital statistics.' Records of births were kept in ancient times, notably by the Romans. The records in this country are now usually kept by the local boards of health, through notifications on the part of attending physicians. In many states this is compulsory. The statistics are useful in comparing them with deaths, enabling a nation to determine causes of increase or decrease in population. In France there has been a notable decrease in the birth rate for many years, and this has also been true since the World War in all those countries which participated. France now offers premiums to all mothers of two or more children, regardless of whether the children are of legitimate birth or not. But even before the war it had been noticeable that the birth rate per thousand of population had been on the decline in all civilized countries. It has also been observed that the rate increases with prosperity and declines with hard times. The tendency is not necessarily deplorable, since modern sanitation and education counteract it, and while fewer children are born, those that are born are better cared for. The United States Census Bureau reports, for 1920, a birth rate of 23.7 per thousand of population, as compared to a death rate of 13.1 per thousand. In that year 1,508,874 births were recorded, but this only covers the 'registration area.'

territory covering only a little over 63,000,000 of the population. The highest birth rate was in Virginia, where it amounted to 28.3 births for each thousand of the population. The birth rate is noticeably higher among the uneducated, but on the other hand, this is more than counteracted by the high rate of infant mortality.

BIRUNI (973-1048); Arab. scholar; two of his works, *Chronology of Ancient Nations* (1879) and *History of India* (1888) have been trans. into Eng.

BISBEE, a city of Arizona, in Cochise co. It is the center of an important copper mining and smelting region and its industries are chiefly connected with mining. Pop. 1920, 9,205.

BISCAY, VISCAYA (43° 20' N., 3° 15' W.), one of three Basque provinces, N.E. Spain; mountainous, thickly wooded; rich in minerals; inhabited by Basques (*q.v.*); capital and chief port, Bilbao (*q.v.*); area, 836 sq. miles. Pop. 350,000.—Biscay, Bay of (45° N., 4° W.), bay of the Atlantic, formed by coasts of France and Spain; named from Span. province of B.; subject to severe storms, owing to its exposure to the prevailing S.W. winds and the opposition of its current to the tides.

BISCEGLIE (45° 15' N., 16° 29' E.), seaport, on Adriatic, Italy; cathedral. Pop. 28,600.

BISCUITS, crisp thin cakes, manufactured chiefly from flour, with salt, sugar, butter, etc. Dough passes from kneaders to rollers, whence sheets of requisite thickness proceed over endless conveyor-bands to punching-machine, then through long baking-ovens to packers.

BISECTRIX, BISECTOR, line dividing angle, or point dividing line into two equal parts.

BISHOP, an official of the Christian Church in all those branches that have maintained the Catholic tradition and some others. In the Catholic theory b's, priests, deacons, and subdeacons are the major orders.

BISHOP AUCLAND (54° 39' N., 0° 41' W.), market town, Durham, England; coal, iron, and cotton. Pop. 14,000.

BISHOP, SIR HENRY ROWLEY (1786-1855), Eng. composer; was successively musical director at Covent Garden, Drury Lane, and Vauxhall; subsequently prof. of Music at Edinburgh and Oxford; knighted 1842, being the first musician to receive that honor; chiefly remembered by settings

of Shakespeare's songs, and popular ballads like *My Pretty Jane* and *Home, Sweet Home*, introduced into his opera, *Clari* (1822).

BISHOP, WILLIAM AVERY (1894); Canadian airman; major R.F.C.; officially credited with bringing down seventy-two Ger. machines, and unofficially with over a hundred. Awarded V.C.

BISHOP, WILLIAM HENRY (1847); author, was born at Hartford, Conn., and educated at Yale. He then studied architecture, later becoming editor and proprietor of the Milwaukee Commercial Times, holding this position until 1877. For nine years he was instructor of modern languages at Yale and for seven years was United States Consul, first in Genoa, Italy, and then in Palermo, Italy. He is the author of many books, amongst them being *Detmold, A House Hunter in Europe*, *Queen People*, *Old Mexico and her Lost Provinces* and *The Faience Violin*, the last translated from French of Champfleury.

BISKRA (34° 55' N., 5° 36' E.), town and oasis, Algeria, comprising number of small villages, separated by olive groves and date palms; genial winter climate; popular resort; captured by French, 1844; military post. Pop. 7,500.

BISMARCK, a city of North Dakota, the capital of the State, and the county seat of Burleigh co. It is on the Missouri River and on the Northern Pacific and other important railroads, 195 miles west of Fargo. Its important public buildings include the State Capitol, State Prison, and court house, State Hospital for the Insane, St. Paul's Seminary and the United States Indian School. The river is here spanned by a bridge constructed at a cost of \$1,500,000. The city is the center of an important agricultural region. Pop. 1920, 6,951.

BISMARCK, ARCHIPELAGO (4° S., 150° E.), island group, S. Pacific.

BISMARCK, OTTO EDUARD LEOPOLD, PRINCE VON, DUKE OF LAUENBURG (1815-98), Ger. statesman; b. Schönhäusen, Brandenburg, admitted to public service (1835); undertook management of family estates in Pomerania (1839); app. Deichhauptmann (1846); represented lower nobility of his district in Estates-general (1847); helped to found the *Kreuzzeitung* (organ of Prussian monarchical party); sat for Brandenburg (1849); Prussian representative in Federal Diet (1851-59); discovered its subservience to Austria, and became convinced that only by 'blood and iron' could Germany be welded into a national state. Amba-

sador at St. Petersburg (1858), at Paris (1862), B. was appointed Prime Minister (Sept. 1862), and ruled four years without a budget, depending solely for his position on the king's confidence. B. aided Russia during Polish rebellion (hence regarded as enemy of liberty); opposed popular Augustenau claims to Schleswig and Holstein (1863); acting with Austria, he went to war with Denmark.

After Treaty of Vienna (1864) he prepared for war with Austria as only way of securing Prussian ascendancy in Germany. War of 1866 left Prussia supreme in Germany, thus B. finished the work of Frederick the Great; the settlement of 1866 was his work. He became sole responsible minister in confederation of North German States, and pursued a Nationalist policy. After 1870 B. absolutely controlled foreign policy and played foremost rôle in events leading up to Franco-German war. He fostered in Germany the ideal of the strong, effective man, encouraging historians, like Mommsen, who preached Caesarism, and new school of philosophers (of whom Nietzsche was leader), whose standard is merely the amount of energy a man possesses; thus exercised enormous influence on Ger. thought; estranged from ultramontanist Conservatives 1866, his opposition to claims of R.C. hierarchy (1873-66) causing much criticism. He carried through important commercial reforms. A practical, far-sighted statesman, and shrewd, trusty minister, B. was dismissed from office (1890) by William II.

BISMUTH (Bi=208.5), brittle metal of crystalline texture, white or yellowish tinged with faint red; S.G. 9.8; M.P. 268° C.; expands on solidification; found native in Cornwall, France, Germany (especially Saxony), Liberia, etc. B. exists combined with oxygen, carbonic acid, lead, and tellurium; is simple to separate, and readily forms alloys. 'Fusible metal' is formed of 1 part lead, 1 part tin, and 2 parts bismuth. This metal melts at 93.75° C. B. is used externally and internally in medicine.

BISON, the proper name of the so-called American buffalo, which once roamed in great herds over the western and central part of the United States. The bison has a larger head than the ox; with a conical hump and a shaggy mane. Millions of these animals roamed about in great herds, but in the decade beginning with the 70's, they were slaughtered indiscriminately by Indians and by white hunters, so that with the exception of several herds in different parts of the United States, it has practically become extinct. The largest of these

herds is in the Yellowstone National Park, another is in the Bronx Zoological Gardens in New York City, and others in Lincoln Park, Chicago. There are also several private herds. It was announced in 1923 that the government herds were increasing in number. See **BUFFALO**.

BISPHAM, DAVID (1857-1921), Am. baritone singer. He was born in Philadelphia and educated in Haverford College. He studied voice production in Florence under Vannucini, and in London under William Shakespeare. In 1891 he made his début at the Royal English Opera, London, taking the rôle of the Duc de Longueville in *La Basoche*. Later he sang the chief baritone rôles at the Royal Opera, Covent Garden, and at the Metropolitan Opera House in New York, where he appeared in many Wagnerian rôles. He attained enormous success on the concert stage, this leading him to abandon his operatic career. He vigorously supported the use of the English language in singing and was the first well-known singer to use English translation in his recitals of German songs.

BISSAGOS ISLANDS (11° 30' N.; 16° 30' W.), islands, off Senegambia, W. Africa; belong to Portugal.

BISSAU (11° 48' N., 15° 47' W.), port, Portuguese Guinea.

BISSOLATI, LEONIDA (1857-1920), Ital. Socialist and statesman, first president of League of Nations, editor of Socialist paper *Avanti* (1892); member of Chamber of Deputies from 1897 till death. On split in Socialist party (1911) cast in lot with Reformist wing, of which he became leader; advocated intervention in Great War; was member of government (1916-18). His opposition to Baron Sonnino on question of Dalmatia compelled his retirement (1918).

BISTRITZ (47° 8' N., 24° 28' E.), town, Transylvania, Hungary. Pop. 10,873.

BITHUR (26° 36' N., 80° 19' E.), town, on Ganges, United Provinces, India; captured by Havelock, 1857. Pop. 7,200.

BITHYNIA (c. 41° N.; 32° E.), old division, N.W. Asia Minor, bordering on Sea of Marmora and Black Sea. Capitals were Nicomedia, Nicæa; subdued by Lydia, VI. cent. B.C.; afterwards part of Persian empire; independent in III. cent. B.C.; became Roman province, 74 B.C.

BITING ANGLE, in gunnery, the smallest angle at which a projectile will penetrate armor, being the angle

between the axis of the projectile and the armor.

BITLIS (38° 26' N., 42° 3' E.), town, Asiatic Turkey; numerous mosques and churches; red cotton cloth. Pop. 40,000.

BITONTO (41° 7' N., 16° 41' E.), walled town, Italy; castle; bp's see. For victory over Austrians at B., 1734, Span. general Montemar received title of Duke of B. Pop. 26,800.

BITTER, KARL T. F. (1867-1915), sculptor, was born in Vienna, Austria, and educated in a gymnasium there. He studied art in Vienna Academy of Fine Arts, coming to the United States in 1889, where he was employed in architectural sculpture. He won the prize in competition for the Astor Memorial Gates, Trinity Church, New York, and executed sculpture on the Administration and Manufacturers Buildings, Chicago Exposition, on the residence of C. F. Huntington and Cornelius Vanderbilt. He was director of Sculpture at the Buffalo Exposition of 1901 and head of the department of sculpture at the Panama-Pacific International Exposition at San Francisco, 1915.

BITTERFELD (51° 37' N., 12° 15' E.), town, Saxony; founded by Flemings, XII. cent.; machinery. Pop. 13,300.

BITTER LAKE (37° 20' S., 66° W.), lake, La Plata, S. America.

BITTER LAKES (c. 21° N., 33° E.), two lakes, Suez, Egypt.

BITTERN (*Botaurus stellaris*), marsh-loving bird, related to Heron and Stork; feeds on fish; found throughout the Old World, but no longer breeds in Great Britain.

BITTER ROOT MOUNTAINS (46° 40' N., 115° W.), mountains separating Idaho from Montana, U.S.A.

BITTER ROOT RIVER, a tributary of the Columbia River, flowing north into Clark's River, in Missoula County, Mont., being about 110 miles in length. It was famous in the early days on account of the many gold discoveries made along its banks.

BITUMEN, term for mineral compounds of carbon and hydrogen, including naphtha, petroleum, and especially asphalt and its forms.

BITUMINOUS COAL, OR SOFT COAL, containing more volatile elements than 'hard' coal, or anthracite, and therefore used for the manufacture of illuminating gas. It contains from 50 to 75 per cent of fixed carbon, and from 25 to 30 per cent of volatile hydro-

carbons. It burns with a long, smoky, yellow flame. In appearance it is a dull black, lacking the sheeny lustre of anthracite, easily breaking into cubes or plates. It is an undesirable fuel for the home, on account of its smoky character, but is much used by large manufacturing or power plants. When baked in a closed oven it turns into coke. There are about 250,000 square miles of bituminous coal fields in the United States, divided between Pennsylvania and West Virginia, in the Appalachian Mountains, and in the Mississippi Basin, in Illinois. According to the U.S. Census taken in 1919, there were then 8,282 bituminous coal mines in the United States; representing an invested capital of \$1,904,450,123. The total production in that year was 460,425,836 tons, as compared to 88,170,508 tons of anthracite mined.

BITURIGES, a Celtic race, who during the Roman Empire occupied vast tracts of land in Gaul.

BITZIUS, ALBRECHT (1797-1854); Swiss novelist; better known as Jeremias Gotthelf; wrote novels dealing with Bernese peasant life.

BIVOUAC (Fr.) a night-watch; the term is now applied to troops lying out in the open, without tents.

BIWA (35° 15' N., 136° E.), lake, Hondo; largest in Japan (36 miles long).

BIXIO, NINO (1821-73), Ital. soldier; performed brilliant services under Garibaldi; took part in attack on Roma (Sept. 1870), and captured Civita Vecchia.

BIZERTA (37° 16' N.; 9° 48' E.); fortified seaport, Tunisia, N. Africa; excellent harbor; held by French since 1881; naval station. Pop. 25,000.

BIZET, GEORGES, pseudonym of Alexandre César Leopold (1838-75), Fr. composer; gained the *Grand Prix de Rome* (1857); experienced many struggles and privations during his musical career; produced several comic operas, *Les Pecheurs de perles* (1863), *La Jolie Fille de Perth* (1807), and *Djamileh* (1872), which achieved little success, and the charming incidental music to Daudet's *L'Arlesienne*. His masterpiece, *Carmen*, produced in 1875, was received with acclamation, exercised considerable influence on lyric opera, and has retained its popularity.

BJÖRKMAN, EDWIN AUGUST (1866), son of Anders August and Johanna Bjorkman. Educated at Latin School, Stockholm. Emigrated to the United States in 1891. Became editor of *Minnesota Posten* in 1892. Reporter

New York Sun and New York Times, 1899 to 1905. Dept. Editor World's Work, 1912-15. Associate Director League of Nations News Bureau since 1920. Author *Voices of Tomorrow*, 1913; *Scandinavia and the War*, 1914; *The Soul of a Child*, 1922. Has translated many Scandinavian works including plays of August Strindberg, 1912-1915; plays of Bjørnstjerne Bjørnson, 1915; *The Tragedy of Love*, by Gulmar Helberg, 1920; and *The Book about Little Brother* by Gustaf of Gelferstan, 1921.

BJÖRNSON, BJØRNSTJERNE (1832-1910), Nor. poet, novelist, and dramatist s. of a Lutheran pastor; ed. Christiania commenced his career as a journalist. Later he began to write novels, many of which have enjoyed a European reputation. His first work was *Synnove Solbakken*, 1857, followed by *Arne*, 1858; *A Happy Boy*, 1860; *The Fisher Maiden*, 1868; and numerous others. His plays include *Between the Battles*, *Lame Hulda*, *Sigurd the Bastard*, *Sigurd the Crusader*, *Mary Stuart*, *The Newly Married*, *Beyond our Powers*, ranging from poetic tragedy to comedy and social drama. In 1870 he issued his *Poems and Songs and Arnljot Gelline*, including his famous ode *Berghiot*. He was awarded the Nobel prize for lit. in 1903. His later work was used as the medium for the propagation of his radical, social, and religious views; but much of his work entitles him to share with his fellow-countrymen, Ibsen, a foremost place in European literature.

BJØRNSTJERNA, MAGNUS FREDRIK, COUNT (1779-1847), Swed. soldier, statesman, and author; fought in 1813 campaign against Napoleon; promoted alliance with Norway, 1814.

BLACK, ADAM (1784-1874), Scot. publisher; s. of a builder; b. Edinburgh; was first a bookseller, but afterwards took up publishing; became proprietor of the *Encyclopaedia Britannica*, the Waverley novels, and other valuable copyrights; founder of the firm of A. & C. Black; was twice Lord-Provost of Edinburgh, and sat as member for the city for ten years (1856-65).

BLACK, ALEXANDER (1859), son of Peter and Sarah MacCrea Black. Education grammar schools in Brooklyn. Became reporter on Brooklyn Times, Literary Editor Times, 1885-1895; Sunday Editor New York World, 1905-1910. Editor Newspaper Feature Service since 1913. Originated the picture plays in 1913. Author *Photography Indoors and Out*, 1894; *Miss America*, 1898; *The Girl and the Guardsman*, 1900; *Thorney*, 1913; *The Great Desire*, 1919;

The Seven Angels, 1921, and *The Latest Thing*, 1922. Editor Ostrander's History of the City of Brooklyn and Kings County.

BLACK, FRANK SWEET (1853-1913), American lawyer and politician. Graduated from Dartmouth, in 1875. Afterwards edited the Johnstown, N. Y. Journal. Admitted to bar in 1879. Gained distinction in prosecuting murderers of Robert Ross as outcome of election riots in Troy, in 1892. Elected to Congress in 1895 and elected governor of State of New York, in 1897, serving one term.

BLACK, HUGH (1868); educated Glasgow University, 1883-1887. Ordained, 1891, minister Paisley, Scotland, 1891-1896; St. George's Church, Edinburgh, 1896-1906. Came to the United States in 1906 and since then professor of practical theology, Union Seminary, New York. Author *Friendship*, 1898; *Practice of Self-Culture*, 1904; *Christ's Service of Love*, 1907; *Happiness*, 1911; *The Open Door*, 1914; *The New World*, 1915; and *Lest We Forget*, 1920.

BLACK, JEREMIAH SULLIVAN, (1810-1883), an American lawyer. Admitted to bar in 1831. He was appointed Attorney-General of the United States in 1857 by President Buchanan and became Secretary of State in 1860. He retired from public life in 1862.

BLACK, JOSEPH (1728-99), Scot. chemist and physician; b. Bordeaux; lecturer on chem. Glasgow (1756); prof., Edinburgh (1766); discovered carbon dioxide, then called 'Fixed air' (1754), and propounded theories of 'Specific heat' and of 'Latent heat.'

BLACK, WILLIAM (1841-98), Eng. novelist; abandoned journalism for novel writing, scored a great success with *A Daughter of Heth*, 1871; and for nearly thirty years maintained his popularity as a writer of fiction. Not the least of his attractions was his power of describing Scot. scenery.

BLACKBERRY, BRAMBLE (*Rubus fruticosus*), common plant of family Rosaceæ.

BLACKBIRD (*Turdus merula*), the name of a common bird, found all over the northern United States, Europe, in Asia, and N. Africa. It has been acclimatized in New Zealand. In Great Britain it is a resident, but large numbers of emigrants also come in the autumn. The male is entirely black, with bright yellow beak, taking a deeper and more vivid color in the breeding season. The female is a dusky brown, fading to a paler hue beneath. The nest, built in

thickets or creeper-clad trees, is of grass and moss, and plastered with mud; the eggs, four to six in number, are blue with brown specks. The B. is a fine song-bird, its notes being clear and loud, but it has not the range or modulations of the thrush. Destructive to fruit and seeds, it also feeds largely on worms, grubs, snails, and is therefore useful in keeping down garden pests. Its old Eng. name 'ousel,' appears in the name of a variant, the 'ring-ousel,' so called from its white neck marks.

BLACKBURN (53° 45' N., 2° 30' W.), town, Lancashire, England; cotton-weaving; birthplace of Hargreaves, who invented spinning-jenny, 1764. Pop. 1921, 129,400.

BLACKBURN, COLIN BLACKBURN BARON (1813-96), Eng. judge; made a lord of appeal (1876), and noted as a high authority on common law; author of the *Law of Sales*.

BLACK COUNTRY, Eng. mining and manufacturing district in South Staffs, stretching from Birmingham to Wolverhampton in one direction, and Walsall to Dudley in another.

BLACK EARTH, fertile soil deposit resembling loess, covering large areas in S. Russia.

BLACKFEET, small tribe of N. Amer. Indians of Algonquian family, living in Montana and Canada.

BLACK FLUX, composed of carbon and potassium carbonate; like all fluxes a substance used in extraction of pure metal from ores, the flux forming a slag with impurities.

BLACK FOREST, SCHWARZWALD (48° 20' N., 9° E.), mountainous district, Baden and Württemberg, Germany, near Rhine valley; highest peak, Feldenberg, 4900 ft.; extensive forests; minerals; picturesque scenery, tourist resort; cattle clocks; area, 1800 sq. miles. Pop. 571,000.

BLACK FRIARS. See DOMINICANS.

BLACK FRIDAY, May 11, 1866 (England), Sept. 11, 1869, and Sept. 19, 1873 (U.S.), days of financial panic: first due to failure of Overend and Gurney; second to attempt by Fisk and Gould to corner gold market; third to a great financial crash in the New York Stock Exchange.

BLACKIE, JOHN STUART (1809-95), Scot. scholar and poet; for thirty years prof. of Greek in Edinburgh Univ.; pub. *Homer and the Iliad*, 1866; *The Language and Literature of the Scottish Highlands*, 1876; *Lay Sermons*, 1881, and poems.

BLACK HAND (Span. *mano negro*), name of Span. and Ital. secret societies; the latter have within recent years committed outrages in U.S.A.

BLACK HAWK (1767-1838), a famous Indian chief of the Sac and Fox tribes. He joined forces with the British in the War of 1812 and was always a source of trouble to the United States Government. In 1830 a treaty was made with the Sacs and Foxes by which their lands in Illinois were ceded to the government. Black Hawk refused submission. He was driven back by troops at Rock Island, but in March, 1832, he reappeared at the head of a force of 1000 Indian warriors. The Governor of Illinois called for volunteers and soon a force of 2400 was marching to oppose the Indians. They were overtaken and badly defeated on the Wisconsin River. Retreating they were again defeated at Bad Axe River and completely dispersed. Black Hawk, Keokuk and other chiefs were taken prisoners.

BLACK HILLS (44° 30' N., 103° 35' W.), mts., S.W. Dakota and N.E. Wyoming; loftiest peak, Harney, 7216 ft.; extensive forests; fertile; gold, silver.

BLACK HOLE. See CALCUTTA.

BLACKING, for producing a polish on boot leather; contains powdered ivory or bone black, oil, vinegar, sugar, gum-arabic, and sulphuric acid.

BLACK ISLE (57° 37' N., 4° 12' W.), peninsula between Beaulieu and Moray Firths and Cromarty Firth, Scotland.

BLACK LETTER. See PRINTING.

BLACKLOCK, THOMAS (1721-91), Scot. poet; s. of bricklayer; blind from childhood; entered ministry; friend of Burns; *Poems* (1746); collected edit., 1793.

BLACKMAIL, legal term, meaning to extort money under threat of public exposure. The crime is punishable by a severe penalty; even though the statements alleged against a person be true.

BLACKMAR, FRANK WILSON (1854), son of John S. and Rebecca Blackmar. Graduated at University of the Pacific, 1881. Professor of Mathematics, University of the Pacific, 1882-1886; Professor History and Sociology, University of Kansas. Dean of Graduate School since 1896. Contributed to many magazines and scientific journals. Auth. *Economics*, 1907; *The Elements of Sociology*, 1907; *Outlines of Sociology*. Editor, *Cyclopedia of History of Kansas*.

BLACK MARIA, a name given to the

prison van which conveys lawbreakers between court and jail. The phrase is current in both American and English slang and has derivations credited to it that attribute its origin to both countries. The term remains a current colloquialism in London, but is less heard in every-day speech in the United States. One American explanation of its origin traces it to a powerful negress named Maria Lee who kept a sailors' boarding house in Boston and frequently assisted the police in arresting violent offenders. Another story connects the term with a Philadelphia origin in 1838.

BLACK MONDAY, applied to several Easter Mondays noted in history: (1) in 1351, when a severe hailstorm swept over a great part of England and caused much damage and suffering. (2) in 1360, when the Army of Edward III. suffered severely from cold while before Paris, many of the soldiers perishing. (3) in 1909, when 500 English settlers in Ireland were massacred by the native Irish and where Dublin now stands. The expression is also used in Australia, in reference to February 27, 1865, when a destructive storm swept over the settled parts around Melbourne. The expression is used colloquially by Shakespeare in *The Merchant of Venice*, Act II., Scene 5.

BLACKMORE, SIR RICHARD (d. 1729), Eng. physician and poet; physician in ordinary to William III. and Anne, by the former of whom he was knighted; author of a dull, philosophical poem, *The Creation*, tedious epics, and some medical works.

BLACKMORE, RICHARD DODDRIDGE (1825-1900), Eng. novelist and scholar; achieved remarkable success with *Lorna Doone*, 1869; a romance of Exmoor, which has done much to popularize the West Country.

BLACK MOUNTAIN (c. 34° 30' N., 73° 10' E.), mountain range and district, N.W. Frontier Province, India.

BLACKPOOL (53° 49' N., 3° 3' W.); favorite watering-place, Lancashire, Eng.; fine promenade; piers; great wheel, etc., Pop. 65,000.

BLACK PRINCE, THE, EDWARD, PRINCE OF WALES (1330-76), e. s. of Edward III.; distinguished himself in Fr. wars, specially at Crecy, 1346; returned to England, 1373, and became head of political faction opposed to his bro., John of Gaunt. The Black Prince's death left his s. Richard, afterwards Richard II., heir to throne.

BLACK RIVER, the name of several

rivers in the United States; (1) in New York, rises in the northern part of the state, flows southwest through the Adirondacks, then northwest through Herkimer, Oneida, Lewis and Jefferson counties, emptying into Black River Bay, in the extreme end of Lake Ontario, being about 130 miles in total length. (2) in Mo., rising in Reynolds County, flows through the state, bending southwest, entering the Arkansas River a few miles above Newport in Jackson County, the total length being about 400 miles. (3) in Wis., rises in Marathon County and flows directly toward the Mississippi River, which it enters fifteen miles above La Crosse. (4) in Vt., rises in the town of Plymouth, and empties into the Connecticut River. (5) in La., being that part of the Washita River between the mouth of the Tensas and Red rivers.

BLACK ROD, an officer (since XIV. cent.), of the House of Lords and also of the Order of the Garter; app. by the Crown. The black rod from which he derives his title is a black staff surmounted with a golden lion, which he carries as a symbol of office. One of his principal duties is that of carrying communications between the Lords and Commons. Thus, when the King opens Parliament, B. R. is sent to summon the Commons to attend at the bar of the House of Lords to hear the King's speech.

BLACK SEA, OR EUXINE, inland sea, between Europe and Asia (41°-47° 20' N., 27° 30'-41° 46' E.); area, 164,000 sq. m.; outlet to Mediterranean by Bosphorus, Sea of Maromora, and Dardanelles; shores low on N. and W.; good harbors except N.; numerous inflowing rivers; surface waters fresher than ocean, bottom waters salt and lifeless; nearly always ice-free; one island, Adassl, at mouth of Danube.

It was named by the ancients *Pontus Euxinus*, being called *Euxeinus* (hospitable) by the Greeks; over it Jason sailed to find the Golden Fleece, and its shores are the scenes of numerous Gr. legends. Later, Gr. colonies were planted and it was opened up to commerce by Rome and continued to offer free access to Western nations, until Constantinople fell into possession of the Turks (1453), when it was closed to all foreign traders. In 1774 Russia obtained right to trade here; shortly afterwards this right was extended to Austria, Britain, and France, and in 1856 (by Treaty of Paris) to all nations. The sea was declared neutral by the Treaty of Paris, but ceased to be so by decree of the Powers (1871); Turkey declared blockade (1877); Russian Black Sea fleet reorganized (1886);

BLACK SNAKE

Black Sea territory declared Russian prov. (1896).

Operations in the Black Sea.—At the outbreak of the Great War the Ger. cruisers *Goeben* and *Breslau*, eluding the Allied fleets, entered the Dardanelles and were purchased by Turkey (Aug. 10, 1914). This addition to the Ottoman navy challenged Russian supremacy in the Black Sea. Turkey proceeded to commit various acts of aggression, culminating in a raid on Odessa (Oct. 29). After the formal declaration of war at the beginning of Nov., the Russian fleet succeeded in bringing the enemy to action (Nov. 18), and in a running fight damaged several ships including *Goeben*, which struck a mine in the Bosphorus and was *hors de combat* for several months. Russian ascendancy was established and increased by completion of the Dreadnaught *Empress Maria*. During the Dardanelles operations (March 28, 1915), the Russian fleet co-operated by feint attacks on the Bosphorus, and Russian airmen bombed Constantinople. On April 3, Turkish cruiser *Medjidieh* struck a mine in Gulf of Odessa; was salvaged, and added to Russian navy with name of *Prut*. When Bulgaria entered the war in the autumn of 1915, Russian sea forces bombarded Varna. They also maintained a blockade of the Turk. coast to stop transport connection with the Caucasus, and materially aided in the capture of Trebizond (April 18, 1916). At times *Goeben* and *Breslau* attempted counter raids, bombarded undefended coast towns, and sank hospital ships. After the collapse of Rumania at the end of 1916 the Russian fleet gave assistance in the evacuation of Constantza. Admiral Kolchak, who had succeeded Eberhardt, kept intact the loyalty of the Black Sea units in the early days of the Russian revolution, but with the accession to power of the Bolsheviks their morale declined, and many of the ships were sunk or disabled. The Treaty of Peace with Turkey (May 1920), placed the Bosphorus and the Dardanelles under a Commission of the League of Nations. See MAP EUROPE.

BLACK SNAKE, OR BLACK RACER, an American serpent averaging from five to six feet in length in adults, is found throughout nearly all of the North American Continent. The commonest variety, found in the Eastern and Southern states, is a pitchy black above and slate gray, sometimes a greenish white, underneath. Specimens in the West and Southwest differ slightly in being a dark olive green with a greenish or yellow belly. It readily climbs trees, twisting about the lighter branches,

BLACKWATER FEVER

hunting birds and their eggs, and is even able to leap through the air from the branches of one tree to those of another. It is absolutely harmless to man and even when it bites can barely cause an abrasion. An old superstition in the South held that it was able to hold its own tail in its mouth and roll down hill with great speed in the form of a hoop.

BLACKSTONE, SIR WILLIAM (1723-80), Eng. advocate and standard legal commentator; b. London; ed. Charterhouse and Pembroke Coll., Oxford; entered at Middle Temple (1741); fellow of All Souls Coll. (1744); called to bar (1746); D.C.L. (1750); elected to Vinerian professorship (1753); pub. *Commentaries on the Laws of England* (1765-69); subsequently resumed practice in London and sat in the court of Common Pleas.

BLACK TIN, tinstone ore prepared and ready for final smelting. The ore is ground in the stamp mill, then washed for the removal of earthy particles and other impurities easily dissolved by water. Other impurities still remaining, however, it is then roasted in a reverberating furnace, during which sulphur and arsenic are expelled. The result is then mixed with about 20 per cent. of its own weight of finely ground anthracite coal and limestone. This preparation, a black powder, from which it is named black tin, is then ready for the smelting furnace.

BLACKWALL, district, London, Eng.; fine docks; terminus of B. railway, opened 1840.

BLACK WARRIOR RIVER, Alabama, a stream about 300 miles in length which empties into the Tombigbee. It is navigable for small steamboats for about 150 miles from its mouth. It is sometimes called by its Indian name, Tuscaloosa. It drains part of Blount, Jefferson and Tuscaloosa counties. It flows through an extensive coal field.

BLACK WATCH, Highland regiment, wearing dark tartan; established 1688, to repress Jacobitism; comprises old 42nd and 73rd Regiments.

BLACKWATER. (1) (52° N., 7° 52' W.), river, Munster, Ireland; enters Youghal Bay. (2) (54° 31' N., 6° 35' W.), river, Ulster, Ireland; enters Lough Neagh. At Battle of B. (1598) the Irish chieftain, Hugh O'Neill, defeated Sir Henry Bagnall. (3) (51° 47' N., 0° 59' E.), river, Essex; enters North Sea.

BLACKWATER FEVER, a form of malaria, endemic in parts of S. Europe, parts of Asia, and of subtropical and

tropical America and Africa, probably due to a specific protozoal parasite.

BLACKWELL, a city of Oklahoma, in Kay co. It is on the Atchison, Topeka and Santa Fe and other railroads, and on the Chicaska river. The city has several parks and handsome public buildings. It is the seat of the Oklahoma State College. Its industries include the manufacture of clay, brick, glass, flour, etc. Pop. 1920, 7,174.

BLACKWELL, ALEXANDER (1747), Scot. who became royal physician in Sweden; executed for treason.

BLACKWELL, ANTOINETTE LOUISA BROWN (1825-1921), daughter of Joseph and Abby Brown Blackwell. Graduated at Oberlin in 1847, Oberlin Theological Seminary in 1850. Ordained as Congregational Minister in 1853. Later became Unitarian. Prominent in early movement for woman suffrage and other movements for betterment of women status. Author, *The Island Neighbors*, 1871; *The Physical Basis of Immortality*, 1876; *The Philosophy of Individuality*, 1893; *The Make of the Universe*, 1914; and *The Social Side of Mind and Action*, 1915.

BLACKWELL, ELIZABETH (1821-1910), an American physician and the first woman to obtain a degree of Doctor of Medicine in the United States. This was in 1849 and in 1851 she began to practice in New York City. In 1854 she, with her sister Emily Blackwell, opened the Infirmary for Women and Children. From this grew the Woman's Medical College which was opened in 1867. She went to England in 1868 and organized a woman's medical college there, becoming one of its professors. Author of *Laws of Life*, 1852, and *Pioneer Work in Opening the Medical Profession to Women*.

BLACKWELL, LUCY STONE (1818-1893). Graduated from Oberlin College in 1847. She was one of the earliest speakers and workers for woman suffrage. She wrote for the press and contributed largely to magazines and other publicity sources for the cause.

BLACKWELL, THOMAS (1701-57), Scot. classical scholar; b. Aberdeen, and ed. at Marischal Coll., where he became later prof. of Greek, and finally principal; pub. several works on the life and writings of Homer, *Letters Concerning Mythology*, and *Memoirs of the Court of Augustus*.

BLACKWELL'S ISLAND, an island in the East River, New York City, which belongs to the City of New York. It is used as a site of city institutions

including prisons, almshouses, asylums, hospitals, etc. Its area is about 120 acres. Nearly all the buildings were constructed of granite quarried on the island by convict labor. The southern end of the island is crossed by the Queensboro Bridge.

BLACKWOOD, ALGERNON (1869), s. of Sir Arthur and Sydney, Duchess of Manchester. Educated at Moravian School, Black Forest, Wellington College and Edinburgh University. Began writing in 1906 and is the author of a number of works of fiction besides several plays. *The Empty House*, 1906; *The Listener*, 1907; *The Human Chord*, 1910; *The Centaur*, 1911; *Ten Minute Stories*, 1913; *Incredible Adventures*, 1914; *Day and Night Stories*, 1917; *Karma, a Reincarnation Play*, 1918; *The Wolves of God*, 1921, and *The Bright Messenger*, 1921.

BLACKWOOD, WILLIAM (1776-1834), Scot. publisher; founder of the firm of William Blackwood & Sons; b. Edinburgh, of poor parents; apprenticed to a local bookseller at age of 14; later moved to Glasgow and London, but eventually settled in Edinburgh as a bookseller, finally exchanging this trade for publishing; pub. first number of *Blackwood's Magazine*, 1817.

BLADDER (urinary), sac of muscular and membranous structure, serving as a receptacle for urine, which it receives from the kidneys by the ureters and expels from the body through the urethra; when empty it lies entirely within the human pelvis, when distended it rises up into the abdomen. The b. is attached to the pelvis by ligaments at its neck, which is where the urethra commences, at the lowest part of the organ, otherwise it is freely movable, being supported by the neighboring structures, and above, behind, and at the sides, by the peritoneum. Its normal capacity, is about one pint, but this is often enormously exceeded under abnormal conditions.

Cystitis, or inflammation of the b., is due to bacterial infection, usually by way of the urethra, and is manifested by painful and frequent micturition. It is treated by fomentations, urinary antiseptics, and sedatives, and, if necessary, irrigation of the b.

Under certain conditions *calculi* or stones are formed in the b., and these are removed by operation. The usual operation is that of *lithotomy*, in which the stone is crushed by an instrument passed by the urethra and the fragments removed by a catheter. The old operation of *lithotomy*, or 'cutting for stone,' is not now generally advised, but is still

necessary under certain extreme conditions.

Enlargement of the prostate, which may be considered here because of its involvement of the b., is usually first shown by inability of the patient to empty the b. completely, and is generally treated by the operation of opening into the b. by a supra-public incision and scooping out the enlargement with the finger.

BLADENSBURG (38° 44' N., 77° W.), village, Maryland, U.S.A.; British defeated Americans, 1814. Famous as duelling ground in early 19th century. Pop. c. 500.

BLADUD, legendary Brit. king, f. of Lear.

BLAGOVYESHCHENSK (50° 20' N., 127° 40' E.), town, Asiatic Russia; commercial center. Pop. 32,600.

BLAICKIE, WILLIAM GARDEN (1820-99), Scot. theologian; b. Aberdeen; prof. of Apologetics and Pastoral Theology, New College, Edinburgh (1868-97); chairman of general assembly (1892).

BLAINE, JAMES GILLESPIE (1830-93), Amer. politician, journalist, and author; elected to Congress (1862); Speaker (1869); entered senate (1876); Sec. of State (1880-81) and again under Pres. Harrison; nominated for Pres. (1884), but not elected; played important part in Pan-American Congress; wrote *Twenty Years of Congress* (1884-86).

BLAINVILLE, HENRI MARIE DUCROTAY DE (1777-1850), Fr. zoologist and anatomist; prof. at Paris Univ. (1812), and at College de France (1832), succeeding Cuvier; author of various scientific works.

BLAIR, ATHOLL (56° 46' N., 3° 52' W.), village and parish, Perthshire; Blair Castle, Duke of Atholl's seat.

BLAIR, FRANCIS PRESTON (1821-75), Amer. lawyer and general; served in Mexican and Civil Wars; senator, 1870-73; candidate for Vice-President, 1868.

BLAIR, HENRY WILLIAM (1834-1920), son of William Henry and Lois Baker Blair. Educated in schools of New Hampshire. Admitted to bar in 1859. Served in Civil War with rank of lieutenant-colonel. Member New Hampshire House of Representatives in 1866 and in State Senate in 1868. Elected to Congress in 1875 and to the Senate of the United States in 1879. Service in the Senate extended to 1891. Author of Blair bill to extend federal aid to education in the States. Also bill to establish U.S. Labor Department. Wrote largely on temperance and was one of the earliest promoters of prohibition.

BLAIR, HUGH (1718-1800), Scot. preacher; filled various pulpits in Edinburgh, and was sometime prof. of Rhetoric and Belles Lettres in the Univ. His *Sermons* (4 vols.) achieved remarkable popularity.

BLAIR, JAMES (1656-1743); Amer. ecclesiastic and educationist; bp. of Virginia, pres. of its Council, and founder of its College.

BLAIR, JOHN INSLEY (1802-1899). Educated at grammar school and early entered business as merchant. Soon transferred his interest to banking in which he acquired an immense fortune. To banking he added railroad investments and at one time was said to be the largest owner of railroad stock in the world. Loaned the U.S. Government \$1,000,000 at outbreak of the Civil War. Among his gifts for educational purposes were those to the Presbyterian Academy at Blairstown, N.J.; Grinnell College, Iowa; Princeton University and Lafayette College. He was the means of having more than 100 churches erected in various cities and towns in the West.

BLAIR, MONTGOMERY (1813-83); an American lawyer. Graduated from the United States Military Academy in 1835. He resigned in following year and took up law, being admitted to bar in 1839. Became Solicitor of the United States in 1855. Acted for plaintiff in famous Dred Scott Case. From 1861 to 1864 served in President Lincoln's Cabinet as Postmaster-General.

BLAIR, ROBERT (1699-1746); Scot. poet and preacher; b. Edinburgh, and was a 'son of the manse'; author of a long and somewhat dull poem, *The Grave*, which, however, contained some impressive passages, and had the advantage of being illustrated by William Blake.

BLAKE, EDWARD (1833-1912), Canadian-Irish politician; Prime Minister, Ontario (1870-72); M.P. South Longford (Ireland), 1892-1907.

BLAKE, ELI WHITNEY (1795-1886); an American inventor. Graduated from Yale in 1816. After graduating he joined his uncle Eli Whitney in the manufacture of fire arms and founded near New Haven, Conn., the first factory for the manufacture of domestic hardware. He invented a stone crusher used in road making and mining which soon found world-wide use.

BLAKE, JOSEPH AUGUSTUS (1864). Graduated from Yale in 1885 and from the College of Physicians and Surgeons in 1889. Became instructor in surgery in 1900 and professor of Surgery,

College Physicians and Surgeons, in 1903. Consulting surgeon St. Luke's and Roosevelt Hospitals. Surgeon in American ambulance, Neuilly, France, 1914-15 and at Ris Orangis, 1915-17. Surgeon-in-Chief American Red Cross Hospital in 1917. Commissioned major, Medical Corps U.S. Army in 1918. Member many scientific societies both in America and abroad.

BLAKE, ROBERT (1599-1657), Eng. admiral and naval hero; b. Bridgwater, Somersetshire; sat in Short Parliament (1640); adherent of parliamentary cause; distinguished himself for resolute defense of Bristol (1643), Lyme (1644), and Taunton; app. with two colonels to command of fleet (Feb. 1649); destroyed bulk of Royalist squadron near *Cartagena* (Nov. 1650); fought successfully against Dutch, who were led by famous commanders, Ruyter, Tromp, and Witt (1652-53), and by his victories founded Eng. naval supremacy; defeated the Spaniards (1655-56), inflicting crushing, final blow at Santa Cruz (1657); died at sea (Aug. 17); renowned for skill, daring, and lofty character; innovator in tactics.

BLAKE, WILLIAM (1757-1827), Eng. poet, mystic, and engraver; s. of a small London hostler; apprenticed at the age of 14 to an engraver; engraving remained his chief occupation for life. At the age of 25 he married Catherine Boucher, the good genius of his life, an educated woman, whom he taught to print and color his engravings. At the age of 14, B. wrote the exquisite lyric beginning, 'How sweet I roamed from field to field.' His *Songs of Innocence* appeared in 1789; and *Songs of Experience* in 1794—the poems and decorations being engraved by B. himself. His mystical works include *The Book of Thel* (1789), *The Marriage of Heaven and Hell* (1790), *The Gates of Paradise* (1794), and *The Song of Los* (1795).

BLAKELOCK, RALPH ALBERT (1847-1916), an Amer. painter. Graduated from the College of the City of New York in 1869. Self educated as to art, he gained a wide reputation as a landscape artist. Among the best examples of his art are *Cloverdale, California*; *Moonlight*; *On the Face of the Quiet Water*, and *Cumule*. The Metropolitan Museum of Art, New York, and the Corcoran Gallery, Washington, D.C. contain some of his best pictures. The National Academy made him an Associate member in 1913 and an Academician in 1915.

BLAKENEY, WILLIAM BLAKENEY, BARON (1672-1761), Eng. soldier; lieut.-gov. of Minorca (1747); hero of

gallant defense of Port St. Philip (April 18 to June 28, 1756).

BLAMIRE, SUSANNA (1747-94), Eng. poetess; known as 'the Muse of Cumberland'; author of 'What ails this heart of mine?' 'Ye shall walk in silk attire' (*Collected Poems*, 1842).

BLANC, LOUIS (1811-82), Fr. politician; founded socialistic organ, *Revue du progres* (1839); pres. of government labor commission which established *Ateliers nationaux* (q.v.) (1848); member of National Assembly (1871); wrote several important works on political and social questions; and pub. *Histoire de la Revolution Francaise* (1847-62).

BLANC, MONT (45° 51' N., 6° 53' E.), highest peak (15,782 ft.) of Alps, and loftiest mountain in Europe; first ascended, 1786.

BLANC, PAUL JOSEPH (d. 1904), a French artist. In 1867 he won the Grand Prize of Rome, a first class medal at Paris Salon in 1872; and a first class medal at the Paris Exposition in 1889. Decorated with Legion of Honor in 1878. One of his best known works is that depicting events in the life of Clovis.

BLANCHARD, ARTHUR HORACE (1877), son of Horace K. and Caroline Hill Blanchard. Graduated from Brown University, Providence, in 1899. Entered service American Bridge Company in 1896. Instructor, assistant professor Civil Engineering, Brown University, to 1911. Professor highway engineering, Columbia University, 1911-17, and in 1919 had same chair at University of Michigan. Member of firm of highway transport consulting engineers since 1921. Member of engineering societies, both in the United States and abroad and has written extensively for technical magazines. Author of *Highway* (with Drowne) 1910-12; *High Engineering* (with same) 1913. Editor-in-Chief American Highway Transport Handbook, 1922.

BLANCHE OF CASTILE (1188-1252), dau. of Castilian king, Alphonso VIII. and John's sister, Eleanor; m. Louis VIII. of France; regent for Louis IX. (1226-35; 1248-52).

BLANCO.—(1) (20° 37' N., 17° 4' W.) cape, Sahara, W. Africa. (2) (33° 7' N., 8° 37' W.) cape, Morocco, Africa. (3) (43° 37' N., 6° 49' W.) cape, Spain. (4) (4° 15' S., 81° 11' W.) cape, Peru.

BLANCO, ANTONIO GUZMAN (1828-99), a Venezuelan soldier. He attained prominence in the Federalist revolts of 1859-63 and became vice-president under Falcon in 1863 on

triumph of party. Falcon is deposed in 1868, but Blanco again came to the front in the Revolution of 1870 by which he became President of the republic. He held office until 1882. In 1893 he was appointed minister to France where he resided until his death in 1899.

BLAND. (1) Hubert (1856-1914), Eng. Socialist and journalist; contributed dramatic and art criticism to *Daily Chronicle*, and weekly articles (by 'Hubert') to *Sunday Chronicle* from 1889 till 1914; pub. volumes of essays (e.g.) *With the Eyes of a Man* (1905); was an original member of Fabian Society. (2) Mrs. Hubert Bland (Edith Nesbit) (1858), wife of above; poet and novelist; noted for capable novels with child characters.

BLAND, RICHARD PARKS (1835-1899). He received an academical education and was admitted to the bar. Between 1855 and 1865 he practiced law in Missouri, California and Nevada, settling in Missouri in 1865. He was elected to Congress from that State in 1873 serving continuously, with the exception of the term 1895-97, until his death in 1899. He had great influence upon legislation and was a recognized leader in the House. He is best known as the leader in the Free-Silver movement and as author of the Bland Silver Bill. This bill he introduced in 1877 and provided for the free and unlimited coinage of silver by the United States. The silver dollar had been demobilized in 1873 and its coinage wholly abandoned. The Bimetallists desired to restore it to perfect equality with gold as a standard of value. The Senate amended the bill materially, the free coinage was stricken out and as a substitute the Secretary of the Treasury was authorized to purchase each month \$200,000 and not more than \$4,000,000 of silver bullion for coinage. This coinage was to be unlimited legal tender for all debts. The amended bill, now called the Bland-Allison (after the chairman of the Senate Finance Committee) was passed in 1878. Vetoed by President Hayes, it was passed over his veto and became a law on Feb. 28, 1878. The silver purchase clause of the act was repealed by the Sherman Act of 1890.

BLAND SILVER BILL, see **BIMETALLISM**.

BLANE, SIR GILBERT, Bart. (1749-1834), Scot. physician; head of Naval Medical Board; introduced lime-juice into navy as anti-scorbutic (1795).

BLANK VERSE, unrhymed iambic pentameter verse is so called, because of the absence of rhyme:

'So all day long the noise of battle roll'd
Among the mountains by the winter sea.'

The same verse in rhymed couplets is called 'heroic verse,' and is used, for instance, in Pope's *Homer*. If the rhymes are alternate, as in Gray's *Elegy*, the form is known as 'elegiac verse.' 'Blank verse' was employed as far back as the X. cent., but, in Eng. lit., it was reserved for Marlowe to throw off the shackles of rhyme, and in Shakespeare, his immediate follower, it was brought to a high state of perfection, and has since been regarded as the most suitable medium for the noblest kinds of poetry.

BLANKET BALLOT. See **BALLOT REFORM**.

BLANQUI, LOUIS AUGUSTE (1805-81), Fr. author; founded *Société republicaine centrale*; uncompromising agitator of communism; pub. several works on economic and social questions.

BLANTYRE (16° S., 36° E.), mission station, Nyasaland, Brit. Central Africa; named after Livingstone's birthplace.

BLARNEY (51° 56' N., 8° 35' W.), town, Cork, Ireland; in outer wall of B. Castle is the B. stone, out of reach of ground; to kiss it gives eloquence, hence any one with unusual powers of persuasion is said in Ireland to have kissed the B. stone.

BLASCO IBÁÑEZ, VICENTE (1867), a Spanish novelist. In his early years he was active in radical agitation and was several times imprisoned for the freedom of his utterances and writing. He was at one time a member of the Cortez as a Republican deputy. His fame, however, rests chiefly upon his novels which were popular for many years in Spain before they became known in other countries. His early books include *In the Shadow of the Cathedral*, *Blood and Sand*, *The Dead Command*. He became internationally known through the publication of *The Four Horsemen of the Apocalypse*. It was based on the German invasion of France and Belgium. This was a work of great power and was followed by *Mare Nostrum*, the scene of which was in the Mediterranean and which dealt with the war. He visited United States in 1920 and also spent some time in Mexico during the revolution which established General Obregon as president. Several of his books were produced as moving pictures with great success. These include *The Four Horsemen of the Apocalypse* and *Blood and Sand*.

BLASEWITZ (51° 3' N., 13° 49' E.), town, Saxony, Germany. Pop. 8,000.

BLASHFIELD, EDWIN HOWLAND (1848), educated at Boston Latin School. Studied art in Paris under Leon Bonnat in 1867. Exhibited at Paris Salon yearly, 1874-79; 1881, 1891 and 1892. Also at Royal Academy, London. Returned to the United States in 1881. Among his many paintings these may be cited: *Christmas Bells* and *Angel with the Flaming Sword*. Has decorated many public and private buildings and homes. These include Manufacturers Building, Chicago Exposition, Collins P. Huntington drawing room; central dome, Library of Congress, Washington, D.C.; Lawyer's Club, New York, N.Y.; home of G.W.C. Drexel, Philadelphia, Pa.; home of W.K. Vanderbilt, New York City; home of Adolf Lewishohn, New York City; New Court House, Newark, N.J.; Great Hall, College of City of New York, N.Y.; State Capitol, Madison, Wis.; State Capitol, Pierre, S.D.; Church of St. Matthew, Washington, D.C. Became National Artist in 1888. President Federation of Fine Arts of New York; ex-president Society of American Artists. Has lectured upon art subjects at Harvard, Yale and Columbia. Author (with Mrs. Blashfield) *Italian Cities*, 1900; co-editor, *Vasari's Lives of the Painters*.

BLASIUS, ST. (*d.* 316), martyr bp. of Sebaste, Armenia; feast, Feb. 3; emblem, a comb; protects from affections of the throat.

BLASPHEMY, illegal act of uttering or publishing matter relating to God, Jesus Christ, the Bible, or Book of Common Prayer, intended to wound the feelings of mankind, to excite contempt and hatred against the Church by law established or to promote immorality. The extreme penalty is fine and imprisonment for three years, but it is rarely inflicted.

BLASS, FRIEDRICH (1843-1907), Ger. classical scholar; his principal work was *Die attische Beredsamkeit* (1868), and he produced numerous critical editions of Gk. authors.

BLAST FURNACE, a furnace in which ores are melted in contact with the fuel, the combustion of the latter being accelerated by air being pumped into the furnace through the bottom under heavy pressure. Furnaces range from a few feet in height to over 100, the big ones being for iron ore. The interior of the furnace is usually round, like the inside of a cannon, tapering gradually toward the top. At the bottom is the hearth, where the air is introduced by means of pipes. The fuel and the ore are dumped in from the top, in alternate layers, combustion going on meanwhile. As these layers expand from heat they sink

to the wider portions of the furnace. Finally the molten metal reaches the hearth at the bottom of the furnace, the consumed fuel, in the form of slag, floating on top. Through a hole near the bottom the molten metal is tapped, usually twice a day. In the large iron reducing furnaces it usually takes the ore from a day to a day and a half to reach the bottom in a molten state. A modern furnace will treat from 400 to 800 tons of ore in a day. Formerly there was great danger to the workers attending the blast furnace from 'break-outs,' the intense heat of the fire crumbling the brickwork and causing an outburst of molten metal, enough to flood the whole floor of the foundry, sometimes killing a dozen men at a time. The modern blast furnace has reduced this danger to a minimum, by having wound around it, within the brickwork, coils of pipe through which cold water is constantly circulating. The structure is also encased in a steel jacket, heavily banded on the outside. A modern blast furnace, with all its equipment, may cost from \$500,000 to \$1,000,000. There are about 500 in the country, most of them being in Pennsylvania and around Pittsburgh, in the steel manufacturing districts.

BLASTING, method of shattering large masses of solid matter, such as rock, by explosive compounds; used chiefly in quarrying, mining, engineering, and road and railroad cutting, and for removing obstructions to navigation, such as reefs. Before the invention of gunpowder the only way rock could be quarried or removed was by chisel or wedge and hammer, or sometimes by 'fire-setting,' which consisted of building a fire on the rock and then pouring on water, which caused the rock to crack and splinter. When large, regular blocks of stone are required, the wedge is still used, as the action of explosives generally shatters the rock into irregular pieces.

Up to 1864 gunpowder was the explosive compound generally used, but in that year nitro-glycerine was applied to b. by Alfred Nobel, who in 1867 invented dynamite. This name is now generally applied to any compound of a highly explosive character. Other explosives are nitro-cotton and gun-cotton, porous substances which have absorbed a quantity of dynamite. Dynamite is seldom used in its free state, owing to its great tendency to explode accidentally. Litho-fracteur is a form of gun-cotton, whilst a combination of nitrate of barium and gun-cotton forms tonite. Gelatine or b. jelly is a solution of gun-cotton in nitro-glycerine in a jelly-like form, and is of violent explosive

force. Many other explosives have been invented, but the use of the majority is forbidden.

BLASTODERM, embryological term, a thin membrane formed of cells or blastomeres resulting from the segmentation of the ovum, which gradually surrounds the yolk.

BLAVATSKY, HELENA PETROVNA (1831-91), Russ. theosophist; claimed to have been initiated into esoteric Buddhism, and to have the power of communicating with the unseen world. With Col. Olcott and other converts she founded, in America, the Theosophic Society (1875). Mme B. was the author of *Isis Unveiled* (1877) and *The Key to Theosophy* (1889).

BLAYDES, FREDERICK HENRY MARVELL (1818-1908), Eng. classical scholar; was a Northamptonshire clergyman, but devoted his leisure to a study of the Gk. dramatists, and pub. trans. of the principal works of Aristophanes, Sophocles, and Æschylus.

BLAYE-ET-STE-LUCE (45° 8' N., 0° 40' W.), town, Gironde, France. Pop. 3,423.

BLAZON, the heraldic description of a coat-of-arms in the proper terms of Armory.

BLEACHING is the decolorizing of materials by chemical treatment. The materials may be cotton, linen, wool, silk, straw, etc., and the b. may be by oxidation or reduction.

Oxidizing b. agents are: b. powder (calcium chlorohypochlorite Ca.Cl.OCl , prepared by saturating slaked lime with chlorine gas); *eau de Javelle* (potassium hypochlorite, KOCl); sodium hypochlorite, NaOCl (obtained by passing chlorine into sodium hydroxide solution: $2\text{NaOH} + \text{Cl}_2 = \text{NaCl} + \text{NaOCl} + \text{H}_2\text{O}$, or by electrolysis of sodium chloride solution: $2\text{NaCl} = 2\text{Na} + \text{Cl}_2$, $2\text{Na} + 2\text{H}_2\text{O} = 2\text{NaOH} + \text{H}_2$, $2\text{NaOH} + \text{Cl}_2 = \text{NaCl} + \text{NaOCl} + \text{H}_2\text{O}$); air and ozone; sodium peroxide, Na_2O_2 ; hydrogen peroxide, H_2O_2 ; potassium permanganate, KMnO_4 , and dichromate, $\text{K}_2\text{Cr}_2\text{O}_7$. The most important of these agents is b. powder, from which chlorine is liberated by dilute acid, thus: $\text{CaOCl}_2 + 2\text{HCl} = \text{CaCl}_2 + \text{H}_2\text{O} + \text{Cl}_2$. Dry chlorine will not bleach, and the action of moist chlorine is attributed to the liberation of nascent oxygen from water, thus: $\text{Cl}_2 + \text{H}_2\text{O} = 2\text{HCl} + \text{O}$. So bleaching is due to oxidation.

Reducing b. agents are: sulphur dioxide, SO_2 ; sulphurous acid, H_2SO_3 , and sulphites, (e.g.) sodium 'metabisulphite', $\text{Na}_2\text{S}_2\text{O}_5$; hydrosulphites (or

true hyposulphites), e.g. sodium hydrosulphite, $\text{Na}_2\text{S}_2\text{O}_4 + 2\text{H}_2\text{O}$. B. by reduction is probably due to the addition of hydrogen to the coloring matter, thus: $\text{SO}_2 + 2\text{H}_2\text{O} = \text{H}_2\text{SO}_4 + 2\text{H}$, and is not so permanent as b. by oxidation, because reoxidation by the air gradually takes place.

BLEACHING POWDER, otherwise known as chloride of lime, calcium oxychloride, or calcium hypochlorite, is a chemical compound prepared by the action of chlorine on slaked lime. The use of chlorine for bleaching was first suggested by the French chemist, Berthollet, in 1785, and four years later he prepared the liquid known as *Eau de Javel*, by the action of chlorine on potash. This compound and a similar one made by treating soda with chlorine, were widely used for bleaching for several years, but were not satisfactory owing to their instability and their high cost. In 1798, Charles Tennant suggested the use of lime in the place of soda or potash, and since that date the manufacture of chloride of lime has grown to the proportions of an important industry.

There has been much dispute regarding the exact chemical composition of bleaching powder, and even to-day the nature of its formula remains somewhat obscure. The theory which finds the most general acceptance is that the dry powder has the composition CaOCl and that the addition of water produces a mixture of Ca(OC)l and CaCl_2 . That some chemical change occurs when water is added is obvious from the fact that there is a rise in temperature accompanied by a perceptible swelling of the powder. Kept in the dark in airtight containers bleaching powder is fairly stable, but light, warmth, moisture and carbon dioxide all bring about rapid decomposition. It appears on the market as a white powder having a strong odor of chlorine. Its content of 'available chlorine' should be approximately 37 per cent.

It is manufactured by leading chlorine into compartments filled with perforated shelves covered with slaked lime. The lime used is selected with care. The magnesia and silica contents should be low, as the presence of magnesia renders the product less stable, while silica introduces an insoluble constituent, which is obviously disadvantageous. Bleaching powder is widely used. For bleaching purposes, it is in demand in the textile, paper and other industries while its properties as a disinfectant and deodoriser render it valuable for sanitary purposes.

BLENDE or **SPHALERITE**, zinc sulphide (ZnS); found in cubic and tetra-

hedral commonly twin-crystals, very brittle, semi-transparent to opaque. Brown, black, red, yellow, or green, it usually contains admixtures of iron, sometimes cadmium sulphides soluble in strong nitric acid, leaving sulphur; abundant Cornwall, Derbyshire, Cumberland; used for preparation of zinc vitriol and sulphur.

BLENDING, mingling varieties of tea, tobacco, wines, whiskies, etc. Woolen b. is mixing of different wools for cloth.

BLENEAU (47° 44' N., 2° 56' E.), town, France; French defeated Spanish, 1652.

BLLENHEIM (48° 38' N., 10° 37' E.), village, Bavaria, near Danube; at Höchstädt (q.v.), in neighborhood, Eng. and Austrians under Marlborough and Prince Eugene defeated French and Bavarians under Tallard and Marsin and Elector of Bavaria, Aug. 13, 1704; Allies casualties amounted to 12,000; Tallard's army destroyed.

BLLENHEIM (41° 34' S., 174° E.), town, New Zealand; fruits.

BLLENNERHASSETT, HARMAN (1765-1831), Amer. lawyer, of Irish birth and education; after his marriage settled in America, and became intimate with Aaron Burr (q.v.), in whose conspiracy he became implicated. He afterwards became a cotton planter, and finally a lawyer. His wife achieved some popularity as a poetess.

BLLENNIES (*Blenniidae*) includes c. 350 species of long-bodied fishes with long dorsal and anal fins; mostly small, active fishes common about shore rocks in all regions, although a few occur in fresh waters. Several species, the shanny, the gunnel or butter-fish, and the wolf-fish or cat-fish inhabit Brit. seas, but only the last, which may be 5 or 6 ft. long, is of value as food.

BLEROT, LOUIS (1871), Fr. aviator; first to 'fly' Eng. Channel (1909).

BLESSINGTON, MARGUERITE, COUNTESS OF (1789-1849), Irish writer and woman of fashion; dau. of Edmund Power, a small landowner; m. Captain Farmer, a drunken rake, after whose death she m. the Earl of Blessington. The earl d. 1827, and Lady B. afterwards lived under the protection of Count D'Orsay who had previously m. her step-daughter. She traveled much on the Continent, made the acquaintance of Lord Byron, and her London house attracted most of the notabilities of the period. She edit. *The Book of Beauty* and *The Keepsake*, pub.

a few novels and other books, including her *Conversations with Lord Byron*.

BLIGH, WILLIAM (1754-1817), Eng. admiral; served under Cook and Howe. was sent to the Pacific (1787) in charge of H.M.S. *Bounty* for the purpose of introducing the bread-fruit tree into the West Indies. His crew mutinied (1789), and B. and some others were cast adrift. He eventually reached England; fulfilled his mission in the W. Indies; and afterward took part in the battles of *Camperdown* and *Copenhagen*, and was made Gov. of New South Wales.

BLIND and BLINDNESS. In medical terminology the expression blindness means absolute sightlessness; partial blindness being known medically as amaurosis or Amblyopia. Blindness cannot always be accounted for, but in general it may be said to arise from inflammatory or degenerative changes in some part of the path between the cornea without and the visual center (or that part of grey matter especially concerned with sight) within. Through better comprehension of the causes, and through modern development of hygienic ideas and of medical science, blindness is now on the decrease. The most important cause is purulent inflammation of the eyes of newly born infants, which can in nearly every case be very simply prevented, and, in its early stages, always cured. Moreover, it has been calculated that half the blindness existing is preventable in one way or another. See under *ERM*.

BLIND, CARE OF THE. Modern social welfare work has so ameliorated the condition of blind people that it can no longer be said that they are helpless as a class. Certainly few need resort to begging, the fate of many in former days. By the help of schools that provide elementary and higher education and vocational training in teaching music, piano tuning and a variety of occupations and handicrafts that can be followed by the blind, many of the sightless rank now side by side with their more fortunate fellow-creatures as self-supporting wage-earners. It is only since the latter part of the eighteenth century that any attention was paid to teaching the blind to utilize their capacities despite their lack of sight. A Frenchman, Valentin Haüy, started the first blind school in Paris in 1784, where the printing of raised or embossed characters was first undertaken. Haüy is counted the great apostle of the blind. Similar institutions later came into existence in Vienna, Berlin, Edinburgh and Glasgow, and every country in Europe duly supported residential schools for instructing the blind.

In the United States the first care bestowed on the blind was due to private effort and private funds. Pioneer schools were started between 1829 and 1833 in Boston, New York and Philadelphia, and exist today. At their inception, public interest in educating the blind was stimulated by the success with which the deaf and dumb had been taught and also by the gratifying results accomplished in Europe with blind pupils. Back of the movement, however, was a general recognition that all children of the state should be educated both as a matter of public policy and as a private right, including the physically defective. States established schools for the blind appropriated funds for their support, and the establishments inaugurated as State institutions today number 44 throughout the country. Each State makes provision for its blind of school age.

Industrial training is an essential part of the school course. It embraces useful handicrafts for boys and young men like chair-caning, hammock-making, broom-making, carpet and rug weaving, mattresses renovating, and netting and mop-making; while girls and young women crocheting, fancy weaving, reed basketry, domestic science and simple housework. There have been few callings in which blind persons have not acquitted themselves well, given the opportunity. The Federal government subsidizes the American Printing House for the Blind at Louisville, Ky., which furnishes every blind school in the country with embossed books free of expense. Most State libraries and a number of public and school libraries maintain departments where such books for the blind are available. The blind also have their periodicals, which the post office carries free.

In 1910, of 7,976 blind males gainfully employed in the United States, 1,768 were farmers, 665 broom-makers, and 646 musicians and music teachers. The World War added to the number of the blind. As to their proportion to the population, the last available census figures (1910) enumerated the blind at 57,272 or 62 out of every 100,000 persons in the United States. Half were sixty and more years of age.

BLIND SPOT. An oval-shaped spot in the retina where the optic nerve enters from the rear. It is blind to both color and light, as proved by Mariotte in 1668. The reason for this blindness is that the nerve fibers have not spread out at this point, so that when light falls upon it no impression is conveyed to the brain. Since vision depends entirely upon the effect of light waves upon the

optic nerves, it follows that any object which reflects rays so that they fall only upon the blind spot, is not seen.

BLIND, KARL (1826-1907), Ger. revolutionary (1848 onwards).

BLIND, MATHILDE (1841-96), Eng. poetess; step-dau. of Karl B.; author of *Prophecy of St. Oran* (1881), *The Heather on Fire* (1886), and *The Ascent of Man* (1888). She also trans. the *Memoirs of Marie Bashkirtseff*, and wrote biographies of George Eliot and Madam Roland.

BLISS, CORNELIUS NEWTON (1833-1911). Received early education in New Orleans. Removed to Boston and entered commission business. In 1881 he formed a dry goods commission house in New York city. Always a strong party man, he was elected chairman of the New York Republican State Committee in 1877. Became Treasurer of the National Republican Committee in 1892 and again in 1896 campaigns. Declined to become Republican candidate for Governor of New York in 1884 and 1891. Appointed by President McKinley Secretary of the Interior in 1897.

BLISS, DANIEL (1823-1916), an American missionary. Graduated from Amherst College in 1852 and from the Andover Theological Seminary in 1855. Ordained in Congregational Ministry in same year. Went as missionary to Syria in 1851, and in 1866 became president of the Syrian Protestant College at Beirut. His publications in Arabia, include *Mental Philosophy* and *National Philosophy*.

BLIZZARD, name given in U.S.A. to bitter, snow-laden wind; most severe b's occur in Central and W. States.

BLISS, TASKER HOWARD (1853), an American soldier; b. in Lewisburg, Pa. He graduated from West Point in 1875. He was professor of military science at the United States Naval War College from 1885 to 1889. He served in Cuba and the Spanish-American War. He was made Chief of Staff in 1917. He was one of the American delegates to the Peace Conference at Paris.

BLOCK, WILLIAM MURRAY (b. 1855), son of James and Eliza Murray Block. Educated at Franklin and Marshall College, 1870-1873. Graduated United States Military Academy, at West Point, 1877. Commissioned 2d Lieutenant U.S. Engineers in 1877. Promoted through all grades to Colonel, Corp. of Engineers. Long engaged on

work of river and harbor improvement. Commissioner for District of Columbia, 1897-98; Chief Engineer in campaign in Philippine Islands, 1898; Chief Engineer, Division of Cuba, 1900-1. In charge of river and harbor improvements, Maine, in 1904 to 1906. Brigadier-General of Engineers, 1916; Major-General, Oct. 8, 1917.

BLOCKADE. Before the World War, blockade meant the cutting off from all commercial intercourse by sea of one or more of the enemy's ports. Since this involved interference with the right of neutrals to trade with either belligerent, blockade had to be enforced by certain rules and regulations. During the World War, when Great Britain applied commercial and economic pressure to the Central Powers, a complete revolution was wrought in our ideas of blockade, and the old rules and regulations need not, therefore, be detailed. The mere isolation of the Ger. North Sea ports—blockade of the Baltic ports was always impossible—would have effected nothing, for the enemy could have supplied himself through Holland and the Scandinavian countries. A similar difficulty arose during the American Civil War. After the Federal fleet had blockaded the southern ports, the Confederates arranged to get supplies through Mexico. To this the Federalists replied by asserting the doctrine of 'continuous voyage or ultimate destination,' and stopping goods consigned to Mexico, but really intended for the Confederates. On this principle the Allies stopped all vessels going to or coming from Scandinavia and Holland, and seized so much of their cargoes as was shown to be of enemy origin or destination. All shippers in northern neutral ports were required to obtain from the Brit. consul certificates of origin, and these were only issued after proof that the goods were in substance neutral. All other goods from these ports were liable to seizure. Though this action was said to violate the Declaration of London, Brit. proceeded on the Orders in Council of May, 1915, which declared that enemy goods in neutral ships would be seized in retaliation for the German submarine campaign. The measures indicated above practically brought the enemy's outward trade to an end by the close of 1915. The stoppage of enemy imports was, however, a much more difficult matter; neutral nations had to be treated with consideration, and Amer. public opinion had especially to be conciliated. The consequence was that a completely effective stoppage of imports was always hampered. Nevertheless, by the middle of 1916 the blockade

of the Central Empires was far more complete than any blockade of history. The problems involved were very complicated, and involved not only the searching of neutral ships but the determination of what goods were genuinely intended for neutral consumption. Ultimately neutrals were induced to accept a system of rationing based on pre-war supplies. Their acceptance of this measure obviated the doubtful validity of the procedure.

Interception of the overseas trade of our enemies was only a portion of the blockade. Similar steps were taken to prevent goods passing through Switzerland; this was largely managed by the French and Italians, through whose country the goods had to pass before reaching the Central Powers. It is certain, however, that this part of the blockade was never so complete as it might have been. Efforts were also made to limit the exports to the Central Powers of produce and manufactures from the northern neutrals and Switzerland, but after elaborate negotiations the result was only partially satisfactory. After the entry of America into the war, the Allies had control of all important sources of overseas supply; nevertheless it is doubtful if more was achieved than under earlier conditions. The truth is that up to the end of the war all the border neutrals, except Norway, and perhaps Sweden, were more afraid of Germany than of the Entente. It is worthy of notice that Denmark, though she ran graver risks than the others, maintained a commercially favorable attitude to the Entente throughout the war.

The cumulative effect of the blockade was undoubtedly to inflict a large amount of hardship and suffering on enemy population, but the blockade was no worse in its effect than the novel and murderous methods of warfare introduced by the Germans. It was largely the blockade that broke down the Ger. morale, though it would be too much to say that the war could have been won by blockade alone.

BLOCKHOUSE, name, which dates back to the XVI. cent., for a small temporary fort composed of logs, corrugated iron, or other material, roofed in, and loopholed for rifle fire. It is sometimes surrounded by a trench, and entirely covered with earth to render it bomb and fire proof.

BLOCK ISLAND, an island in the Atlantic Ocean off the coast of Rhode Island, to which it belongs. It received its name from Adrian Block, a Dutch navigator, who discovered it in 1616. At its southeastern end is a lighthouse which is visible for over 20 miles. The

Island is a favorite summer resort.

BLOCK PRINTING, still practiced in China and practiced in Europe before the invention of type. It was employed in China 50 B.C. The matter to be printed on a whole page was first inscribed on a very thin paper, and might include illustrations. The paper was then pasted, face down, on a block of wood. An engraver then carved out the blocks so that the printing was brought out in relief. The raised surfaces were then inked, a piece of paper laid carefully over them and a brush was applied to the back of the paper. In 925 A.D. the Imperial College of Peking had all the Chinese classics printed by the method. It is still in use in provincial parts of China, not only because of the cheapness of labor, but because Chinese characters are especially adapted to this method, each word requiring a character of its own. In Europe the initial letters of manuscripts were first made on blocks, and gradually block printing came into practice, the whole page being carved on one block. But when individual type was cast, it was quickly abandoned.

BLOCK SIGNAL SYSTEM. A method of railroad traffic regulation, whereby the operator of a train is warned by some form of signal when his train approaches closer than a predetermined distance to the preceding train. In some systems, a device placed close to the track adjacent to the signals, engages with a trip on the locomotive, automatically shutting off the power and applying the brakes, thus bringing the train to a stop, when it attempts to pass a signal set at danger.

The mechanism is as follows:—The track is divided into sections called blocks, which on long, straight stretches may be three or four miles in extent, while on curved mountainous sections they are but several hundred yards long. Where traffic is heavy the blocks are short, whereas light traffic permits of longer blocks. Electric, or combined electric and pneumatically operated signals are placed at the dividing lines between blocks. These signals are controlled through relays by devices placed on the track at points one or two blocks distant. When the train passes one of these track instruments the wheels either complete an electric circuit, or depress levers which do so, thereby simultaneously setting the distant signal at clear, and the adjacent signal at danger. In most systems, when the signal two blocks back is set at clear, that one block back indicates caution, and the signal at the entrance to the block occupied by the train, dan-

ger. Thus greatly reduced speed should be used, after passing a signal set at caution, while danger should effect a complete stop. On single track roads, over which trains are operated in both directions, additional interlocking devices are employed, which prevent one train's entering a block in which another is running in the opposite direction.

BLOEMFONTEIN (29° S., 26° 40' E.), formerly republican capital, now provincial capital, Orange Free State (q.v.), S. Africa; situated on a plain; elevation, 4518 ft.; well-built, large gardens; healthy climate; Grey Univ. Coll.; seat of Supreme Court of S. Africa; Military Coll.; occupied by Lord Roberts, March, 1900 and annexed May 28. Pop. 1921, 38,865 (white 19,333)

BLOIS (47° 35' N., 1° 20' E.), town, Loir-et-Cher, France, on Loire; castle of great hist. interest (XIII-XVI. cent's); favorite residence of Fr. kings; Gothic cathedral; wine, shoes. Blois was one of the important headquarters of the American Expeditionary Force during the World War. Pop. 24,000.

BLOIS, COUNTSHIP OF, held in fee by Robert the Strong, Margrave of Neustria, and his successors (865-c. 940); then passed to Capetian family; subsequently united with crown by accession of Louis XII., grandson of Louis I., Duke of Orleans, who had purchased it from Guy II.

BLOIS, LOUIS DE (1506-66), Flemish mystic; became Abbot of Liessies (Hainaut), 1530; many of his works, which were written in Latin, have been trans. into English: *Book of Spiritual Instruction* (1900); *Comfort for the Fainthearted* (1903); *Sanctuary of the Faithful Soul* (1905).

BLOMEFIELD, FRANCIS (1705-52), Eng. topographer; rector of Persfield (Norfolk); author of a valuable *History of Norfolk*, two vol's only being pub. during his lifetime, the work being completed in eleven vol's at a later date.

BYONDEL (fl. XII. cent.), Fr. troubère; according to legend, discovered Richard Cœur de Lion, imprisoned at Dürrenstein, by singing one of Richard's songs.

BLONDIN, CHARLES (1824-97), stage-name of Jean François Gravelet, Fr. tight-rope walker; crossed Niagara Falls (1859) on a tight-rope, during the course of which performance he carried a man on his back, cooked an omelette, and wheeled a barrow. He appeared at the Crystal Palace, London, or elsewhere in England during 1861-62; after-

BLOOD

wards retired, but reappeared (1880); last appearance (1896).

BLOOD, red fluid which circulates in the arteries and veins of animals, in order to nourish the body, to carry away waste products to the excretory organs, and to protect the body against invading organisms. Human b. has S.G. 1.055, a salt taste, and an alkaline reaction. It is composed of the fluid element, or *blood plasma*, which carries food substances and waste products in solution, and the cellular elements, or *red* and *white corpuscles* and *blood platelets*. In a cubic millimetre of human b. there are about 5,000,000 red corpuscles, 8000 white corpuscles, and 500,000 blood platelets. In shape a red corpuscle is a disc, concave on each side, and slightly thicker at the edge. It is composed chiefly of nitrogenous material with which is in loose chemical combination an important protein named *hemoglobin*, which combines with oxygen and yields it up on its concentration decreasing. This power of oxygen-carrying, which the red corpuscles have in the hemoglobin, is their most important quality. White corpuscles, or *leucocytes*, are derived from lymph glands and the spleen, and are of various kinds and shapes, being classified mainly according to the staining qualities they exhibit under the microscope. The great value of the white corpuscles is in the power they have of destroying inflammation products, etc., and thus protecting the body. Blood platelets are small circular bodies, about half the size of red corpuscles, and are believed to have an important function in the clotting of b. In the process of clotting *fibrin* is precipitated from the plasma in the form of fine threads, which interlace in every direction, and entangle the corpuscles in their meshes; during the process *fibrin* is also believed to be derived from the clumps which form blood platelets. Resistance to disease caused by bacteria is due to the white corpuscles and the formation of certain anti-bodies in the b., which either destroy the bacteria or assist the white corpuscles to do so. This resistance can be produced or stimulated artificially by the injection of the products of bacteria or their toxins in regulated non-lethal doses.

In Anæmia, either primary or secondary, the amount of hemoglobin in the blood is lessened, either in the individual red corpuscles, or through diminution in the number of red blood corpuscles.

In Leucocythæmia, or Leukæmia, the white corpuscles are enormously increased, being deposited in the liver, kidney, and other organs; and there is anæmia.

BLOOD-RAIN

BLOOD-LETTING, formerly practiced in almost all diseases, is still performed under certain conditions of, e.g., chronic valvular disease of heart, pericarditis, toxæmia, either by venesection, cupping, or by means of leeches.

BLOOD PRESSURE. In pumping the blood to different parts of the body, the heart creates a certain pressure on the arteries, in exactly the same manner as a pump will create pressure in a pipe through which it is forcing water. The first to measure the pressure thus produced was Stephen Hales, who, in 1733, measured the blood pressure of a horse by inserting into one of its arteries a small brass pipe which he connected to a long glass tube, held perpendicular. He found that the blood rose, in this tube, to a height of eight feet, rising and falling to some extent with the pulsations of the heart. On inserting this tube into a vein he found that the blood rose only about twelve inches, [thus demonstrating the much greater pressure in the artery than in the vein. About one hundred years later the French doctor, Poisenille, used a mercury manometer in the place of the glass tube, and thus paved the way for the instruments used to-day for determining blood pressure in human beings. The sphygmometer, as it is called, consists, in its simplest form of a rubber bag, covered with silk, which is pressed against an artery until the pulse is obliterated. The bag is connected with a mercury manometer, and the pressure of blood in the artery compresses the air in the bag, which, in turn, forces down the mercury in one arm of the manometer, causing it to rise in the other. Many refinements exist in the more modern sphygmometers, and instruments of great precision and delicacy are now manufactured, but the principle in all of them remains the same. As an indication of obscure disease the blood-pressure is of much importance, and the test now forms part of the routine investigation made into the physical condition of applicants for life insurance, and in other general health examinations. The normal blood pressure varies with age, being lower in the young than in the old, and ranges from 110 to 140 millimeters of mercury. In certain diseases of the kidneys the pressure rises, and high pressure is also an indication of hardening of the arteries, and of a tendency to gout or apoplexy. During physical exertion or mental excitement, the pressure rises, and athletes in perfect health have been found to show a blood pressure as high as 190 m.m. at the end of a long race.

BLOOD-RAIN, rain which occurs in

Mediterranean regions, having absorbed reddish sands blown from African deserts.

BLOOD ROOT, also known as Indian Paint or Red Puccoon, an early spring flower of North America, whose orange-red sap, found principally in the root was formerly used by the Indians as a war paint, but is now employed as a dye for baskets and skins. The leaves are heart shaped, deeply lobed, each folded singly about an individual flower stalk, on which blooms a white or rose-colored blossom. Belonging to the poppy family, its sap contains a large percentage of alkaloids.

BLOODSTONE, *Heliotrope*, a variety of chalcodony with bright red spots and streaks.

BLOOD-WORMS, the aquatic larvae of midges belonging to the family *Chironomidae*.

BLOOMER, AMELIA JENKS (1818-94), Amer. dress reformer, after whom 'bloomers' are named; was a pioneer of the women's dress reform movement (short skirt and loose trousers); was also a worker in the cause of temperance and woman's suffrage.

BLOOMFIELD, a city of New Jersey, in Essex co. It is on the Delaware, Lackawanna and Western and the Erie railroads, and on the Morris Canal. It is connected with Newark and other neighboring cities by trolley lines and is 10 miles north-west of New York. It is the seat of a German Presbyterian Theological Seminary and Mountain-side Hospital. It is a favorite place of residence for many business men of New York. Its industries include the manufacture of organs, woolen goods, hats, paper, hardware, brass goods, etc. Pop. 1920, 22,019.

BLOOMFIELD, ROBERT (1766-1823), Eng. poet; pub. several vol's of verse dealing with rural life; his best-known poem, *The Farmer's Boy*, had a large sale, and was illustrated by Bewick; *Remains* (1824).

BLOOMINGTON, a city of Illinois, the county seat of McLean co. It is on several important railroads and is 126 miles south-west of Chicago. It is an important industrial city and has manufactures of machinery, stoves, farm implements, patent medicines and large railroad shops. It is the seat of the Illinois Wesleyan University, several hospitals and sanitariums. The Illinois State University and the State Soldiers' Orphans Home are at Normal, two miles from the city. Pop. 1920, 28,638; est. 1923, 29,709.

BLOOMINGTON, a city of Indiana, the county seat of Monroe co. It is on the Chicago, Indianapolis and Louisville, and other railroads, and is 60 miles southwest of Indianapolis. Bloomington is the seat of the Indiana State University and has important industrial interests including the manufacture of leather and hardware. It is well supplied with banks and daily and weekly periodicals. Pop. 1920, 11,595.

BLOOMSBURG, a city of Pennsylvania, the county seat of Columbia co. It is on the Susquehanna River and on several railroads, and is 40 miles west of Wilkes-Barre. It is the center of an important iron and limestone region and has a number of iron foundries, as well as silk mills, brass works, furniture factories, etc. Bloomsburg is the seat of the State Normal School. Pop. 1920, 7,819.

BLOOMSBURY, district, London, mostly in parish of St. Giles-in-the-Fields.

BLOUNT, CHARLES (1654-93), Eng. deist; author of *Anima Mundi* (1679), in which he expresses his views on immortality; *Great is Dianna of the Ephesians* (1680), an attack upon priestcraft; and a trans. of the first two books of *Apollonius Tyaneus*.

BLOUNT, EDWARD (fl. 1588-1632), Eng. printer; was the joint-printer with Jaggard of the 'first folio' of Shakespeare's plays (1623), which he is supposed to have helped Heming and Condell to edit. He also pub. some works of Marlowe and Lily, and himself trans. from Spanish and Italian.

BLOUNT, THOMAS (1618-79), Eng. antiquary; author of *Nomolexicon* (1670), a legal dictionary, and similar antiquarian works; but is chiefly remembered as the author of the *Boscobel* tract (1651) describing the adventures of Charles II. after Worcester.

BLOUNT, SIR THOMAS POPE, Bart. (1649-97), Eng. author; bro. of Charles B. (q.v.); author of *Essays on Several Occasions* (1692), in which he deals with educational and other topics.

BLOUNT, WILLIAM (1749 - 1800), Amer. conspirator; chiefly remembered for his share in conspiracy to seize Florida and Louisiana for Great Britain; impeached and expelled from U.S. Senate.

BLOW, JOHN (1648 - 1708), Eng. composer and organist; b. North Collingham (Notts); became chorister of the chapel royal; organist of Westminster Abbey (1669-80); composer to the chapel royal (1699). He wrote an im-

mense number of anthems and services, besides odes and other forms of music.

BLOWERS, ELECTRIC. An electric blower is a unit consisting of a blower or centrifugal fan, mounted on the same shaft as, or directly connected to an electric motor. This term is usually applied to small sized units, with motors not over one horsepower. Such small units are extensively used for furnishing forced draft to small boilers, for ventilating rooms, shafts and passageways, and for supplying a small amount of air at low pressures for blowing dust out of inaccessible places, such as the windings of electrical machinery, or for more domestic uses, the corners of furniture, books, etc. Some types used as hair driers have electric heating coils in the discharge duct, thereby delivering hot air.

Electrically driven fans such as those used to enforce the circulation of air in warm weather, are not generally known by the name of Electric Blowers. Properly speaking Blower designates only that type of positive rotary blowing machine which can deliver air at a considerable pressure [up to 10 lbs. per sq. inch] such as the Root or Connorsville. That form of construction commonly known as the Steel plate, or multivane type is called centrifugal fan. It is used to work against comparatively low pressures, at most about 16 oz., and is made up of a rotating arbor or plate, to which is attached a number of blades, either straight or curved. When this drum is rotated the columns of air between the blades are given a centrifugal motion, delivering air from the center to the wheel circumference. There are numerous designs of this type, but the most widely known is the Davidson commonly called the Sirocco Fan. The term blower has been extended by popular usage to include various forms of centrifugal fans, especially in the smaller sizes.

BLOWITZ, HENRI GEORGES STEPHAN DE (1825-1903). Anglo-Fr. journalist; became chief Paris correspondent of *The Times* in 1873, for which paper he had acted for some time as assistant-correspondent. He soon became a force not only in journalistic but diplomatic circles, and on more than one occasion influenced international affairs.

BLOW-PIPE, instrument, consisting in its simplest form of a tube with mouthpiece and fine nozzle, for blowing air or gas through a flame so as to direct and concentrate it upon a substance; used in glass-blowing, soldering, and chemical analysis.

BLOW - PIPE, BLOW - GUN, reed

pipe used for blowing poisoned arrows by the S.A. Indians, Borneo Dyaks, and other savage tribes, and formerly by some of the N.A. Indians. The pipes vary from 3 to 11 ft. in length, and the arrows from a few inches to 18 in. The weapon is called by the Indians *pucuna*; by the Dyaks *sumpitau*.

BLUBBER, oil lying beneath skins of whales and other sea mammals; used for machine oil; Eng. whale fishery (XVIII.-XIX. cent's) chiefly to obtain b., by mariners of Hull and Yorks ports, flourished.

BLÜCHER, GEBHARD LEBER-ECHT VON (1742-1819), Prince of Wahlstatt, Prussian General; one of the leaders of Prussian war-party (1805-6); became commander-in-chief of Silesian army during War of Liberation; became a general field-marshal (1813); won action of *Laon* (March, 1814); defeated by Napoleon at *Ligny* (June, 1815); made decisive charge at *Waterloo*; possessed virtues of dashing cavalry soldier, but was without tactical skill of great commander; said to have been uncultivated, but naturally shrewd, vigorous, upright character.

BLUE, a primary color, of which the sapphire stone represents a type. Artists divided the shades into cobalt, indigo, Prussian, and ultramarine. There are many colloquial uses. From XVII. cent. until 1864 there were Red, White and B. Squadrons in the Navy; the Royal Horse Guards (XVII cent.) were known as 'the B's'; the 'b. Peter' (contraction of *b. repeater*) is a ship's flag hoisted as signal of approaching departure; a univ. B. is a member of Oxford (dark) or Cambridge (light) Univ. who plays in matches, or takes part in the boat-race, between these univ's.

BLUEBEARD, nickname of monster in a fairy tale by Charles Perrault (1697), who murdered his wives and hid their bodies in a secret chamber.

BLUE-BIRDS, name applied to genus *Sialia* of N. America and Bermuda, which nests in holes in tree trunks; also to *Irene puella*, native of India, Ceylon, and Burma.

BLUE BOOK, publication containing parliamentary reports, usually contained in a blue paper cover.

BLUEFIELD, a city of West Virginia, in Mercer co. It is on the Norfolk and Western Railroad and is an important industrial center and has railway shops, flour mills and wholesale business houses. It is in the famous Pocohontas coal fields and is the distributing center for this field. Here is the State Normal

School. There are several sanitariums, a Federal building, and other public buildings. Pop. 1920, 15,282.

BLUE GRASS, certain species of genus *Poa*, foliage bluish green; *P. pratensis* found in 'blue-grass' region of Kentucky.

BLUE GROUND, matrix of S. African diamonds.

BLUE ISLAND, a city of Illinois, in Cook co. It is on the Illinois Central and other railroads, and is a suburb of Chicago, about 2 miles south of the limits of that city. It has important industries, including stone quarries, wire works, smelting works, etc. Pop. 1920, 11,424.

BLUE JAY, a bird native to all of eastern North America, except the Florida peninsula, its habitat extending as far west as the Dakotas, central Nebraska, eastern Kansas and central Texas. It is one of the many varieties of the Jay family; about eleven inches in length, the upper part of a greyish, violet-blue color, the under parts grey and white, the wings and tail rounded, the head crested. Its eggs are of a pale olive, speckled with a darker green. It is one of the noisiest and most active of birds, not unlike a crow, with many of the crow's pugnacious characteristics.

BLUE MOUNTAINS.—(1) (30° 46' S., 151° 50' E.) mountains, New S. Wales, Australia; (2) (29° 30' S., 27° 55' E.) Basutoland, S. Africa; (3) (44° 54' N., 64° 6' W.) Nova Scotia; (4) (40° 10' N., 77° 37' W.) Pennsylvania; (5) (18° 5' N., 76° 50' W.) Jamaica; (2) (18° 12' N., 78° W.) town, Jamaica; (3) (12° 20' N., 84° 30' W.) river, Mosquito Coast, Nicaragua.

BLUE RIBBON.—(1) part of insignia of the Garter; (2) any token of supreme honor; (3) badge adopted, 1883, by total abstainers.

BLUE RIDGE, the most easterly range of the Appalachian or Allegheny Mountains in the United States, lying nearest to the Atlantic Coast. It runs from the Highlands at West Point, New York State, through New Jersey, Pennsylvania, Virginia, the Carolinas and Georgia to Alabama. It is sometimes confused with the Kittatinny or Blue Mountains of Pennsylvania, which lie behind to the west. The range acquires the name of Blue Ridge on entering Virginia, the western portion of which it traverses. Here its extreme height is not much over 4,000 feet; in Pennsylvania and New Jersey its height is much less. The range rises highest in North Carolina among the Black Mountains.

BLUEFIELDS, BLEWFIELDS.—(1) (12° 3' N., 83° 53' W.), town, Mosquito Coast, Nicaragua. Pop. 5,000.

BLUEFISH (*Cheilodipterus saltatrix*), relative of horse-mackerels, but with larger scales, highly esteemed as food; an exceedingly voracious and destructive feeder, common in most warmer parts of Atlantic.

BLUE SKY LAWS, legislation enacted in a large number of states for the purpose of protecting the investing public from fraudulent promotion schemes. The first law of this kind was passed in Kansas, in 1911, being directed against the many fraudulent and semi-fraudulent oil enterprises which were then being promoted. During the discussions in the Legislature, one of the members, opposed to the bill, exclaimed, 'How far is this sort of thing to go in oppressing business?' To this another member, favoring the bill, replied: 'The limitations to dishonest enterprises should reach to God's blue sky,' from which came the colloquial term 'blue sky laws.' By 1913 eighteen other states had followed the example of Kansas in legislation with this purpose. Laws restricting dishonest promotion schemes are now to be found in Arizona, Arkansas, California, Connecticut, Florida, Georgia, Idaho, Iowa, Kansas, Louisiana, Maine, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New York, North Carolina, Ohio, Tennessee, Texas, Vermont, Virginia, West Virginia and Wisconsin. Generally such laws compel promoters of new corporations to file information with a state official, usually the insurance commissioner or a corporation commission, describing the enterprise in detail. On satisfactory evidence of the honesty of the enterprise being furnished, it is given a license to proceed with its plans for financing. There was much opposition against these laws and they were contested in the courts as unconstitutional, but in 1917 they were upheld by the United States Supreme Court, as enacted in Michigan, Iowa and Ohio, this decision also covering the laws in 26 other states, which were waiting for the ruling before enforcing. In the decision handed down the court declared that 'prevention of deception is within the competency of government (these laws) do burden honest business, but only that dishonest business may not be done It costs something to be governed.'

BLUESTOCKING, a pedantic woman. The term was first applied, during the Johnsonian period, to men and women who met to discuss literary subjects; one

of them, Benjamin Stillingleet, usually wore blue stockings. The name was later given only to women of literary pretensions.

BLUFFTON, a city of Indiana, the county seat of Wells co. It is on the Lake Erie and Western, the Toledo, St. Louis and Kansas City and other railroads, and on the Wabash River. It is an important industrial city and has foundries and machine shops. It has also manufactures of pianos, clay pottery, tile, etc. Pop. 1920, 5,391.

BLUM, ROBERT FREDERICK (1857-1903), Amer. artist; noted for his black-and-white drawings in the *Century*, *St. Nicholas*, and *Scribner's Magazine*, particularly of Japanese subjects. He was also well known as a colorist, and executed some fine Venetian pictures.

BLUNDERBUSS, obsolete Dutch hand-gun, with bell-shaped muzzle, used for firing at short range; introduced into England during reign of Charles II.

BLUNT, WILFRED SCAWEN (1840-1922), Eng. poet; formerly in the diplomatic service; breeder of Arab horses; has traveled extensively; his *Love Sonnets of Proteus* (1880) and other vol's of verse are highly esteemed; his wife, Lady Anne B., is author of *Bedouins of the Euphrates* (1879) and *A pilgrimage to Nedj* (1881).

BLUNTSCHLI, JOHANN KASPAR (1808-81), Swiss doctor of law and conservative politician; b. Zürich; member of Great Council (1837); prof. of Constitutional Law at Munich (1848) and Heidelberg (1861); helped to found Ghent Institute of International Law (1873).

BLYTH (55° 8' N., 1° 29' W), seaport on river B., Northumberland; ship-building. Pop. 30,000.

BLYTHERVILLE, a city of Arkansas, the county seat of Mississippi co. It is on the Arkansas Southern and other railroads, and is the center of an important agricultural and cotton raising region. Its manufactures include hardwood products and lumber. Pop. 1920, 6,447.

B'NAI B'RITH, ORDER OF, a Jewish organization, founded at New York (1843), for helping distressed Jews and generally promoting the cause of charity.

BOA, see under **SNAKES**.

BOABDIL, ABU ABDALLAH (1482-92), king of Granada; was the last of the Moorish kings; surrendered the

city to Ferdinand and Isabella (1492).

BOADICEA (d. 61 A.D.), Brit. queen; her husband, Prasutagus ruled the Icen tribe, inhabiting portions of Norfolk and Suffolk, and upon his death his dominions were seized by the Romans. Roused by the indignities she and her people had suffered, B. raised an army, attacked several Roman settlements, and destroyed London. She was eventually defeated by the Roman governor, Suetonius, and committed suicide by taking poison rather than fall into his hands.

BOANERGES, SONS OF THUNDER, name given to James and John by Christ (*Mark* 3:17); term applied to orators.

BOARD, a piece of timber; subsequently the name given to a table; hence 'Board of Green Cloth,' 'Board of Trade,' etc., meaning a company of persons sitting in council around a table. In regard to ships, the term 'board' is used in innumerable ways, but it may be noted that 'starboard' (right-hand side of the ship looking forward) dates back to the times before the invention of the rudder, when a large oar was suspended over the right side of the stern, and was known as the 'steer-board.'

BOARDING-HOUSE, a private house for the reception of paying guests. The keeper of such a house is not legally bound to receive any lodger who offers himself, unless he chooses to do so, nor is he, like the innkeeper, responsible for his guests' property. He is expected to take reasonable care of such, but there his responsibility ends. Notices that valuables should be deposited with the proprietor, for safety, are usually exhibited in most large boarding houses.

BOARDMAN, GEORGE DANA (1828-1903). He was the son of an American Baptist missionary of the same name. Graduated at Brown University in 1852 and Newton Theological Seminary in 1855. He filled pastorates in Bardwell, S. C., Rochester, N. Y., and Philadelphia, Pa. Among his writings may be cited *Studies in the Model Prayer: Epiphanies of the Risen Lord* and *Studies in the Mountain Instruction*.

BOARDMAN, MABEL THORP, daughter of William Jarvis and Florence Sheffield Boardman. Educated in private school in Cleveland, New York and in Europe. Given LL.D. degree from Smith College. Member of Central Committee of the Red Cross and delegate to the International Conferences in 1907 and 1912. Took prominent part as an executive in the Red Cross during the

World War and was secretary of the American Red Cross.

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BOAT BILL, BOAT-BILLED HERON - (*Cancerma cochlearia*), broad-billed Night-Heron, found in the forests along Brazilian rivers.

BOBILI (18° 30' N., 83° 5' E.), ancient town, Madras, India. Pop. 17,000.

BOBOLINK, Amer. bird (*Dolichonyx oryzivorus*), noted for its song and strength of wing.

BOBRUISK (53° 8' N., 29° 12' E.), town, on Beresna, Russia; ironworks. Pop. 40,600.

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In 1358 he completed his great prose masterpiece, the *Decameron*, upon which he had been engaged for ten years. This work—which in its style combines both the classic and the mediæval—sets forth how, during the plague of 1348, seven court ladies and three gentlemen seek refuge in a country villa, where, to while away the time, they relate tales. These tales number one hundred, and though many of them are very indelicate in subject, the mastery Italian in which they are written serves to give the *Decameron* a place amongst the greatest books the world has seen.

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Pop. 24,000.

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BOEHM, SIR JOSEPH EDGAR, Bart. (1834-90), Eng. sculptor; A.R.A. (1878); R.A. (1882); executed statues of Queen Victoria (Windsor), Carlyle (Chelsea), Dean Stanley (Westminster), Wellington (Hyde Park Corner), and many others.

BOEHM VON BAWERK, EUGEN (1851), Austrian statesman and writer on economics.

BOEHME, JAKOB (1575-1624), Ger. philosopher and mystic; s. of a peasant. Received little education, herded cattle while a boy, and eventually became a shoemaker. From his earliest years he was of a contemplative disposition. His first work, *Aurora*, was pub. 1612, and similar works followed. The purpose of his studies is to explain the origin of all things, and his writings, which have been trans. into English and numerous other languages, have exercised considerable influence on European thought.

BOELCKE, CAPTAIN (d. 1916), Ger. airman; b. Dessau, Anhalt; first to practise 'hawk-swoop'; exercised great influence on Ger. air service; credited with a bag of thirty-eight Allied machines; forced down and killed by a Brit. opponent.

BEOTIA (38° N., 23° 30' E.), district, ancient Greece; bounded by Phocis, Gulf of Corinth, Attica, and the Euripus; chief city was Thebes; chief river, Cephissus; chief lake, Copais; plains bounded by mountains; Mt. Helicon in S.W. Thebes (*q.v.*) was chief power in Greece in IV. cent. B.C.; lost importance after Macedonian conquest; B. is now a monarchy of Greece. Pop. c. 66,000.

BOERS, descendants of Dutch settlers at the Cape, who trekked up-country and founded republic of the Transvaal and Orange River, which became part of British Empire in 1902.

BOER WARS, see SOUTH AFRICA and TRANSVAAL.

BOERHAAVE, HERMANN (1668-1738), Dutch physician and scientist; lecturer (1701), prof. of Bot. and Med. (1709), rector and prof. of Practical Med. (1714), and prof. of Chem. (1718), Univ. of Leyden. The most famous physician of XVIII. cent.

BOETHIUS, ANICIUS MANLIUS SEVERINUS (c. 480-524 A.D.), Rom. statesman, author, and philosopher; brought up in Rome; subsequently he won favor of Theodoric the Ostrogoth;

became consul in 510. At once a great official and author, he was noted as a philosopher, mechanist, astronomer, and theologian; accused of treason by Cyprian, the *magister officorum*, towards end of Theodoric's reign, he was put on his trial before the Senate, and condemned; was imprisoned for a year, and while in prison he wrote his famous *De Consolatione Philosophiae*, which for cents. was one of the great textbooks of moral wisdom. His goods were confiscated, and he himself tortured and put to death in 524; he was regarded as a martyr some cents. after his death. Several theological works have been ascribed to his authorship; he also wrote several commentaries, a text-book on music, and trans. into Latin some of Aristotle's works.

BOGARDUS, EVERARDUS (1647); one of the early settlers of New Amsterdam, now New York, and minister of the Dutch Reformed Church. He is best known as being the husband of Anneke Jans whose farm originally comprising 60 acres, forms now one of the most valuable sections of New York City. The Bogardus heirs have formed an association to recover legal possession of this property, now held by Trinity Church, but thus far unsuccessfully.

BOGHAZ KEUI (40° N., 34° 30' E.); village, Angora, Asia Minor; ruined temple.

BOGERT, GEORGE H. (1864); an American artist. Son of Henry and Helen Anderson Bogert. Studied art under Thomas Eakins and in Paris, France, under Raphael Collins, Aimé Morot and Puvis de Chavannes. Has won the Webb prize; 1st Hallgarten prize of the National Academy of Design; bronze medal at Paris Exposition of 1900. Is an Associate Member of the National Academy.

BOGERT, MARSTON TAYLOR (1868), son of Henry and Mary Lawrence Bogert. Graduated from Columbia University in 1890. Given LL.D. degree by Clark University in 1909. Became assistant in organic chemistry at Columbia University in 1894, reaching full professorship there in 1904. Was President of Organic Section of 8th International Congress of Applied Chemistry in 1912 and President of Amer. Section of Società chimica italiana in 1920-21. Member of various scientific societies in the United States and Europe. Appointed Chief Chemical Service Section, U.S. Army and assistant director of Gas Service in 1918.

BOGO (11° N., 124° E.), town, Philippines. Pop. 15,000.

BOGOMILI, sect of Gk. Church, XII. to XVI. cent's; founder, Basil, burned, 1118; may have developed from early Eastern heresies which survived into the Middle Ages. The B. held Christ was the Son of God by grace and adoption—not by inherent divinity; rejected the sacerdotal system and thought images idolatrous. They resembled the Paulicians

BOGOTA, SANTA FÉ DE BOGOTA (4° 35' N., 74° 10' W.), capital, Colombia; cathedral, capitol, observatory, library, univ., and museum; seat of abb.; subject to earthquakes; founded by Quesada, 1538. Pop. 144,000.

BOGRA, BAGURA (24° 53' N., 89° 14' E.), town, Bengal, India. Pop. 7,094. District (24° 55' N., 89° E.). Pop. 855,000.

BOGS are common in land formerly covered by forests; often covered with peat; known as 'moss' in N. of England (Also CHAT MOSS, SOLWAY MOSS.). B. Butter is yellow, oleaginous, mineral substance found in peat b. B. Ironstone is a porous limonite variety.

BOGUTSCHUTZ (50° 16' N., 19° 4' E.), mining village, Silesia. Pop. c. 15,000.

BOHEMIA, western land of Czechoslovakia (48° 35'-51° N., 12° 6'-16° 50' E.); bounded N. and W. by Germany, S. by Austria, E. by Moravia. Surface is undulating plateau with slight northern slope, surrounded by mountain ranges, N.E. by Riesengebirge, N.W. by Erzgebirge, S.W. by Bohemian Forest, S.E. by Bohemian and Moravian Mts.; drained by Elbe and tributaries, chief being Moldau, Iser, and Eger.

Climate is genial in valleys, cold in upper districts. About one-third of surface forested; over half cultivated; chief crops, wheat, rye, barley, oats; flax, hops, fruit, beet produced; hops important for beer manufacture, and beet for sugar. The chief mineral is lignite; black coal, iron ore, silver, gold, antimony, zinc, tin, graphite, lead, sulphur also produced; manufactures include sugar, woollens, carpets, cottons, linen, silk, gloves, glass, buttons, bottles, porcelain. There are mineral springs at Carlsbad, Marienbad, Franzensbad, Teplice, Johannisbad, Bilin, Sedlitz. Bohemia imports agricultural machinery and road-rollers from U.K., tools from Germany. Cap. Prague. Area, 20,065 sq. m.; pop. 6,770,000, of whom over 5,000,000 are Czechoslovaks, the remainder Germans.

History.—Early inhabitants of Bohemia were Celtic tribe called Boli, conquered by Marcomanni, Teutonic,

tribe, 1st cent. B.C. Other Teutonic tribes followed; ultimately Czechs, Slavonic tribe, subdued country about A.D. 450. Early history obscure; seems to have been divided into number of small states or principedoms, united for short time under Samo in 7th cent.; came into collision with Charlemagne in 8th cent., becoming tributary to him. Introduction of Christianity occurred in 9th cent. in reign of Borswog, prince of Premyslid dynasty, which ruled Bohemia for 600 years. Kingly title first bestowed on Wratislavs (1088). In 13th cent. Premysl Ottakar II. extended his dominions; joined Teutonic knights in crusade against Prussia; defeated Hungarians; acquired Carinthia, Istria, part of Italy; ultimately came into conflict with emperor, Rudolph of Hapsburg, by whom he was defeated and slain near Marchfeld (1278). With his grandson, Wenceslas III., the Premyslid dynasty came to an end (1306). From 1310 till 1437 Bohemia was ruled by kings of Luxembourg dynasty. John of Luxembourg, elected in 1310, went on crusade against heathen in Lithuania, when he lost his eyesight; killed at Crécy (1346). His son Charles (1346-78) founded Prague Univ.; became emperor (1349); issued Golden Bull (1356), regulating election of Ger. king. His son, Wenceslas IV., was involved in struggles with nobles; caused St. John Nepomuk to be drowned, and John Huss, reformer, to be burned; period marked by religious wars, which continued in reign of Sigismund (1419-37), who persecuted Hussites; became emperor; d. 1437; succeeded by Albert of Austria, after death of whose posthumous son George of Podebrand was chosen king (1458). George warred against Matthias Corvinus of Hungary; his successor in 1471 was Ladislaus of Poland, in whose reign religious disputes were ended by Peace of Kuttenberg (1485); Bohemia and Hungary united by his election to Hungarian throne in 1490. Reign of Ladislaus' son Louis marked by wars against Turks, who invaded Hungary under Solyman, defeating and killing king at Mohacz (1526). His brother-in-law, Archduke Ferdinand of Austria, elected 1526; subsequently had himself declared hereditary king; crushed revolt in Prague (1547); became emperor; introduced Jesuits in Bohemia; d. 1564. His son Maximilian, emperor and king of Bohemia, tolerated Reformation; and Maximilian's son Rudolph granted Letter of Majesty in 1609, ensuring religious liberty; he was deposed and succeeded by his brother Matthias (1612), whose reign was marked by religious disputes. Matthias died without issue, and his cousin

Ferdinand (Emperor Ferdinand II.), was elected king, but was presently deposed in favor of Frederick the Elector Palatine; whereupon Thirty Years' War broke out. Ferdinand, aided by Bavaria, Spain, Poland, Italy, Saxony, defeated Bohemians at Weissenberg (1620); Elector fled; Ferdinand reinstated; extirpated Protestantism, and re-established Rom. Catholicism; suppressed national privileges, promulgated a new constitution, established Hapsburg as hereditary dynasty in Bohemia, history of which henceforth follows that of Austria. (See **AUSTRIA-HUNGARY**.) On death of Charles VI. (1740), struggle took place between his daughter, Maria Theresa, and Charles of Bavaria—former ultimately successful. Her son, Joseph II., passed Edict of Toleration and established many reforms. In 1848 occurred a quickly suppressed rising in favor of Bohemian independence, after which time there were constant struggles for supremacy between the Czechs and Germans, the former aiming at autonomy. During Great War Czechs and Slovak emigrants organized a Provisional Government at Paris. Revolution on Oct. 28, 1918, and Republic of Czechoslovakia proclaimed Nov. 14, 1918.

Language and Literature.—Czech language belongs to Slavonic subdivision of Aryan group; alphabet has forty-two letters, 'ch' being only guttural sound; there are many inflections and prefixes, and few articles and auxiliaries. Earliest period of literature down to time of Huss is represented by various hymns, legends, didactic and satirical poems, trans. of Bible, and Chronicle of Dalimil. Various religious works were written by Huss and his followers, many of which are lost. Greatest age of Bohemian literature was 16th cent.; historian Hajek may be mentioned among writers of that time. Literature greatly influenced by 'Bohemian Brethren,' among whom Comenius (1592-1670) wrote excellent works on education. See **MAP CZECHO-SLOVAKIA**.

BOHEMIAN BRETHREN, Moravian B.

BOHEMUND, name borne by six princes of Antioch. Bohemund I. (c. 1058-1111), s. of Robert Guiscard, prince of Antioch, efficiently filled his f.'s place; was one of leaders of first crusade. His c., Bohemund II. (1108-31) ally of Baldwin II. of Jerusalem, was slain by Muhammadans. Bohemund III., grandson of B. II., succ. as prince of Antioch (1163), and his s. Bohemund IV., became count of Tripoli (1187). Bohemund V. succ. 1233, and like his f. had to face hostility of Armenia. Bohemund VI. (1237-75), lost Antioch to the Sultan Bibard (1268), and

within two years of death of Bohemund VII. Tripoli was captured.

BÖHM - BAWERK, EUGEN VON (1851), Austrian statesman, studied law and political science; became prof. at Innsbruck, then finance minister, and has held other important political positions; has contributed in his many works to a clearer realization of what 'production' means in the modern world.

BÖHMER, JOHANN FRIEDRICH (1795-1863), Ger. historian; author of numerous works dealing with Ger. history during the Middle Ages.

BOHN, HENRY GEORGE (1796-1884), Eng. publisher; originally a book-dealer on an extensive scale; commenced, in 1846, to pub. the famous 'Bohn Libraries' of standard works in many departments of lit., which extended to nearly 700 vol's. He disposed of his copyrights, in 1864, to Messrs. G. Bell & Sons.

BOHOL (9° 30' N.; 123° 30' E.); island, Philippines; area, 1534 sq. miles. Pop. 250,000.

BOHUN, historical Eng. family whose lands lay chiefly on Welsh marches and finally included earldoms of Hereford, Essex, and Northampton; male line extinguished (1373), when lands were divided between two co-heiresses.

BÖHTLINGK, OTTO VON (1815-1904), Ger. scholar; famous for his Sanskrit studies, his most important work being *Sanskrit-Wörterbuch* (7 vol's, 1853-75).

BOIARDO, MATTEO MARIA, C'NT (1434-94), Ital. poet; author of the celebrated poem, *Orlando Innamorato*, which served as the inspiration of Ariosto's *Orlando Furioso*.

BOIELDIEU, FRANÇOIS ADRIEN (1775-1834), Fr. composer; produced numerous operas and musical pieces which achieved considerable popularity, including *Le Calife de Bagdad*, *Jean de Paris*, *Le Chapeau rouge*, and *La Dame Blanche* (the White Lady of Scott's Monastery), which alone survives and unites simple Scottish airs with light and graceful Fr. harmonies.

BOIGNE, BENOIT DE, COUNT (1751-1830), Fr. military adventurer; after serving in the Irish Brigade and the Russian service he went to India, where he acquired a high position as a military leader on the side of the Mahdratas, and amassed a great fortune.

BOII, a Celtic tribe, who migrated from Gallia Transalpine and subsequently settled in three main groups in the district of the Po, in part modern

Bohemia, and round Bordeaux.

BOIL, painful inflammation of subcutaneous tissue leading to formation of mass of tissue and pus.

BOILEAU, NICOLAS (1636-1711), a Fr. poet. He received a legal and theological education at Beauvais. At 21 years of age he inherited wealth which enabled him to follow his inclination for a literary life. He wrote his first work under the name of Despreaux. In 1660 appeared his *Adieux d'un Poete a la Villa de Paris*. He with Racine, La Fontaine, and Moliere made the famous *Society of Four*. He lost the favor of the King in 1666 through his verse satirizing Chapelain but was again restored to royal favor and a pension in 1677. In 1774 he published his famed *L'Art Poetique*. Besides these he wrote innumerable satires, epistles and verse.

BOILERS. Closed vessels used for the generation of steam under heat pressure. The modern types admit of division according as they are heated internally or externally. Of the internally fired types, which are generally used in England, the Cornish and Lancashire boilers are most familiar. They are cylindrical shells with flat ends. The Cornish type is traversed by a large flue, into which the fire is built on a grate at one end, while the Lancashire boiler has two smaller flues instead of a single large one, affording a structure intrinsically stronger than one equipped with a large flue. The Cornish boiler's element of weakness lies in its single flue, but it is cheaper to build; on the other hand, the Lancashire type is harder to fire.

In ship navigation one of the best known types is the Scotch or cylindrical marine boiler with its various furnaces. The flues have connections inside the boiler with a separate combustion chamber. The operation of the boiler sends the products of combustion from the furnace back to the combustion chamber and returns them to the front end of the boiler through banks of small tubes set in the boiler's water space. A hood of sheet steel fixed in front of the boiler then receives them, and they are conducted to the funnel.

The vertical tubular boiler is a familiar type among those internally fired in the United States. Its cylindrical shell of flat heads is enlarged at one end for a fire box and traversed by a large number of vertical tubes, hence its name. These boilers are serviceable in small boiler rooms, but they are difficult to clean, especially where the water supply forms scale deposits.

Another internally fired type is the

locomotive boiler with its variations in shapes and proportions, its fire box surrounded by an annular space, or 'water leg' on all sides, its blast pipe, through which the exhaust steam is ejected, and its smoke box, which gets the products of combustion from the furnace. When used as a stationary boiler, the locomotive type has a chimney or high funnel which furnishes the necessary draft for combustion.

Externally fired boilers embrace the well known horizontal tubular kind. Its cylindrical shell is usually composed of three courses or rings of plates, riveted together. Inside the boiler are a multitude of tubes which receive the furnace gases on their way to the smoke box and chimney. This type of boiler is accessible for examination and cleaning on virtually every part and has many good qualities, but it is not adapted to extremely high pressure, and its explosions when ruptured are likely to be very destructive.

The horizontal water tube type of externally fired boilers is becoming widely used both in America and Europe. Its tubular elements contain water, instead of being utilized to transmit furnace gases. Such boilers are being used in marine work, especially in the navy. To secure safety and uniform operation, boilers are equipped with valves and gauges that indicate steam pressure and the water level.

BOILING TO DEATH, barbarous punishment for poisoning, coinage, and other crimes, commonly employed in England during the XVI. cent. Humorous instances are cited during the reign of Henry VIII.

BOISE, a city of Idaho; the capital of the State and the county seat of Ada co. It is on the Boise River and on the Oregon Shortline railroad. Boise is 45 miles southwest of Idaho City. Its site was formerly occupied by a trading post of the Hudsons Bay Company. The city is the center of an important agricultural and mining region. It is supplied with pure hot water from a flowing boiling well. Its public buildings include the State Capitol, U.S. Assay Office, State Library, banks, public library, hospitals, etc. It has important industries including meat packing, stone quarrying, and the manufacture of cigars, cement, etc. It is also an important market for the wool-growing industry. Pop. 1920, 21,293.

BOISE, JAMES ROBINSON (1815-1895). Graduated from Brown University in 1840 and served there as tutor and professor of Latin and Greek until 1850. Became professor of Greek at

University of Michigan in 1862, at Chicago University in 1868, and in 1877 professor of New Testament Interpretation at Baptist Union Theological Seminary. Later he went back to University of Chicago as Professor Emeritus of New Testament Greek. He published several classical Greek and Latin text books.

BOIS DE BOULOGNE, a forest on the W. side of Paris, so called after the suburb Boulogne-sur-Seine. It is one of the pleasantest and most famous of the holiday promenades of Paris and is notable as a duelling ground.

BOIS-LE-DUC, a city of Holland, in North Brabant, at the junction of the Dommel and Aa rivers. It is an important industrial city and has manufactures of clothing, hats, cotton goods, etc. Its harbor is excellent and it has considerable commerce by water. The cathedral is one of the most famous in the Netherlands. Here the English were defeated by the French in 1794. Pop. about 45,000.

BOISGUILLEBERT, PIERRE LE PESANT, SIEUR DE (1676-1714); author and economist, magistrate at Rouen (1690); published *Détail de la France* (1695); *Factum de la France* (1705 or 1706).

BOISROBERT, FRANÇOIS LE METEL DE (1592-1662), Fr. poet; entered the priesthood and became Canon of Rouen; he was greatly favored by Richelieu, and after his death attached himself to Mazarin. He wrote *La Belle Plaideuse*, and other comedies, and much verse which enjoyed considerable popularity.

BOISSARD, JEAN JACQUES (1528-1602), Fr. antiquary and poet; he traveled extensively in Greece, and spent many years in Italy in the study of antiquities; his works include *Poemata*, *Romanæ Urbis Topographia*, *Theatrum Vitæ Humanæ*, etc.

BOISSERÉE, SULPICE (1783-1854), Ger. archaeologist celebrated for collection of Early Ger. pictures now in Pinakothek, Munich.

BOISSIER, MARIE LOUIS ANTOINE GASTON (1823-1908), Fr. schol.; sec. of Fr. Academy; devoted himself to the study of Roman antiquities; pub. *Cicero et ses Amis* (Eng. trans., 1897), *La Religion romaine d'Auguste aux Antonins*.

BOISSONADE, JEAN FRANÇOIS (1774-1857), Fr. classical scholar and author of books on recondite classical subjects.

BOISSY D'ANGLAS, FRANÇOIS ANTIONE, COMTE (1756-1826), Fr. statesman; pres. of Convention (1795); member of Committee of Public Safety and subsequently of Council of Five Hundred; proscribed Sept. 1797; lived in England until the Consulate; member of Tribunate (1801); senator (1805).

BOITO, ARRIGO (1842-1918); Ital. composer and poet; his opera, *Meisiofele*, was produced at Milan, in 1868, but that and his other musical compositions, all slight though with marked individuality, achieved little success at the time, but, praised by the critics, have been steadily winning a position. As a writer of libretti he has won distinction, author of the books, of Verdi's *Otello* and *Falstaff*, Ponchielli's *La Gioconda*, and numerous others; Mus. Doc., Cambridge, 1893.

BOJADOR CAPE (26° 12' N.; 14° 27' W.), cape, W. Africa. B. O.; False (26° 30' N., 14° 6' W.), cape, W. Africa.

BOKER, GEORGE HENRY (1823-1890), an American dramatist and poet. Graduated from Princeton University in 1842. Was admitted to bar. Appointed American Minister to Turkey in 1871 and to Russia in 1875. Among his many plays are *Calaynos*, 1848; *Ann Boleyn*, 1850; *Francesco da Rimini*; *The Beithrothed*, and *All the World's a Mask*. His poems include *Königsmark* and *Other Poems*, 1869; *The Book of the Dead*, 1882 and *Sonnets*, 1886.

BOKHARA. (1) Khanate; Central Asia, with Afghanistan on S., elsewhere surrounded by provinces of Russia (39° 45' N., 65° E.); conquered by Russia (1868). Rivers are Oxus, Zarafshan, Surkhhab; soil barren, except where irrigated from rivers. W. is hot and dry, with flat surface, fertile through irrigation; produces pasture for stock-rearing, cottons, vines; middle is plateau, producing pistachios, fruits; E. is mountainous, valleys producing cereals, mulberries; sheep, goats, camels, horses, asses raised; silkworms reared. Minerals include salt, sulphur, alum, sal ammoniac; rice, cotton, wheat, barley, tobacco, fruits, etc., produced. Mixed pop., of whom Uzbegs are most numerous; Mohammedans. Area, 83,000 sq. m.; pop. c. 1,250,000. (2) Cap. of above; has 360 mosques, Mir-Arab being most remarkable; a center of religion and learning; and chief commercial town of Central Asia; textiles. See MAP ASIA.

BOLAS, weapon of S. Amer. Indians; stone balls attached to a hide or hempen rope.

BOLDREWOOD, ROLF (1826-1915), pseudonym of Thomas A. Browne, Anglo-Australian novelist. Novels mostly deal with adventurous colonial life in the early bush-ranging days.

BOLE, earthy clay-like mineral, consisting of silica, alumina, red iron, oxide, and water; occurs in veins, in basalt, and other rocks.

BOLERO, Span. national dance; invented 1780; performed with castanets. The name is also applied to the air to which the bolero is danced.

BOLESŁAW I. (d. 1025); became king of Poland, 992; made Poland a great power, and established a native church.

BOLESŁAW II. (1039-81); Polish king; exiled, 1079.

BOLESŁAW III. (1086-1139); king of Poland; succ. 1102; devoted his life mainly to subjugation of maritime provinces of Pomerania.

BOLEYN OR BULLEN, ANNE (c. 1507-36), second wife of Henry VIII. of England, and niece of Duke of Norfolk. Her father was Sir Thomas Boleyn, cr. Earl of Wiltshire and Ormonde (1529). Henry married her secretly about Jan. 25, 1533; subsequently their marriage was declared valid, and Anne was crowned (June). Birth of a daughter (Sept. 1533). Instead of desired son, disappointed Henry, who soon tired of his arrogant, flighty, voluptuous wife. Anne was imprisoned in the Tower (May 2, 1537) on charges of flagrant immorality, condemned and sentenced (May 15), and beheaded (May 19) on Tower Green.

BOLGRAD, tn., Bessarabia, Rumania (45° 40' N., 28° 39' E.); trade in grain; brick making; tallow factories. Pop. 12,000.

BOLINGBROKE, HENRY ST. JOHN, VISCOUNT (1678-1751), Eng. statesman and writer. Entering Parliament (1701), he attached himself to Harley, becoming War Sec. (1704), and Sec. of State (1710). Cr. Viscount, B. (July 1712), he proceeded to France to conduct peace negotiations, and had a responsible share in underhand negotiations which resulted in Peace of Utrecht (March 31, 1713). Gradually superseding Oxford in the leadership, B. was supreme after Oxford's retirement (July 1714), but his plans for a Jacobite Restoration were upset by Queen Anne's sudden death (Aug. 1) and intervention of Whig lords. Dismissed from office on accession of

George I.; B. joined the Pretender, but having received pardon (1723), he returned to London; was received coldly by Walpole, and organized opposition in conjunction with Pulteney. Success seemed imminent when king died (1727). B. subsequently joined opposition round Frederick, Prince of Wales, but returned to France (1739); finally he settled in Battersea. A famous man of fashion and letters; a plausible and eloquent debater, his diplomacy was subordinated to party necessities. His writings include the *Patriot King*, which inspired the political ideas of Bute and George III.

BOLIVAR (8° 30' N.; 76° W.), department, Colombia; area, 22,320. Pop. c. 425,975.

BOLIVAR (7° N.; 65° W.); state, Venezuela; capital, Ciudad Bolívar; area, 91,870. Pop. 55,744.

BOLIVAR, SIMON (1783-1830); S. Amer. soldier and administrator; b. Caracas, Venezuela; associated himself with cause of independence of Span. colonies in S. America; aided rebellion at Caracas (April 1810), and was commissioned colonel by the revolutionary convention. Venezuela declared its independence (1811); war began, 1812. After varying success, B. defeated Spaniards at Barcelona (Feb. 1811) won victory of Boyaca (Aug. 1811), and finally routed Spaniards at Carabobo (1821). Venezuela and New Granada (1826); subsequently B. exercised supreme power in Colombia (1828-30).

BOLIVIA, inland republic, S. America (8°-22° 54' S., 57° 42'-73° 15' W.); bounded N. and E. by Brazil, S. by Chile and Peru. W. consists of plateaus lying between Andes and Cordillera Real to E.; of these Oruro plateau (with Lakes Titicaca and Poopo) is 13,000 ft. above sea-level; southern part lower, a sandy or salt-covered desert; along N.E., hills sink rapidly, and on E. by series of terraces to northern and eastern plains; former drained by Beni and Mamore to Madeira, latter by Paraguay; other rivers are Guaporé, Purus, etc. Chief mountains are Bolivian Andes; there are many active volcanoes. Climate varies with altitude and exposure; higher plateaus have hot days, cold nights; lower plateaus and eastern terraces temperate; upper valleys sub-tropical; northern and eastern plains tropical; first two regions have wet and dry seasons; elsewhere rain falls all year round. Fauna resembles that of Peru; great variety of birds and insects. Condors and humming-birds occur; wild animals include tapir, jaguar. Chief towns, La Paz, Cochabamba,

Potosi, Sucre, Oruro; railway communications poor (c. 1,500 m.); rivers Beni and Mamore are navigable; roads few and bad.

Resources and Productions.—Upper plateaus produce potatoes, barley; lower plateaus, wheat, corn; upper valleys, fruits; great plains have luxuriant tropical vegetation. There are grassy savannas in S., valuable timber in N.; rubber, copal, coffee, cocoa, coca, rice, cotton, cinchona, pineapples, bananas produced; cattle and sheep largely bred; vicuña, alpaca, llama, guanaco, chinchilla are valued for their skins and wool. Minerals include silver, copper, tin, lead, mercury, zinc, antimony, bismuth, gold, borax, coal; many of these await development. Tin is the great source of wealth, silver coming next in importance. Salt and mineral oil also occur. Chief imports are provisions, wines, spirits, cottons, woollens, silks, linens, clothing, hardware; exports, silver, rubber, tin, wool, hides, cattle, coffee, cocoa.

Inhabitants include Indians, half-breeds, whites, negroes; the white inhabitants are chiefly of Span. descent. Area, c. 600,000 sq. m.; pop. c. 2,200,000.

History.—Bolivia seems to have been united with Peru from earliest times, and so remained after Span. conquest of that country; became prov. of Buenos Aires, 1776. Natives were cruelly oppressed under Span. rule, and several risings occurred. In 19th cent. occurred great struggle for independence, in which the natives were aided by people of Peru and La Plata (1809-25). Rebels, under Bolivar, ultimately seized La Paz (1825), and a month later Spaniards were defeated at Potosi, their last remaining prov. Constitution was framed by Bolivar, from whom country was named, in 1826; and Sucre, who had defeated Spaniards at Ayacucho in 1824, became first president of new republic, accepting office for two years only. Since then frequent insurrections and revolutions have occurred, sometimes followed by changes in constitution. In 1879 war broke out with Chile, during progress of which a revolution occurred in Bolivia; war ended in 1883, when treaty was concluded, whereby she lost her coast prov., Antofagasta, to Chile. Most important recent events have been settlement of boundary dispute with Brazil (1903), when Bolivia obtained district on Matto Grosso frontier and Madeira R., together with \$10,000,000, in exchange for Upper Acre and other districts; and confirmation of coast provinces to Chile in 1905, for which she received money compensation. In 1910 Brazil guaranteed to Bolivia in perpetuity navigation of Madeira, Acre, Amazon and Paraguay.

Constitution, dating from 1880, is republican. Executive vested in president, elected by popular vote for term of four years; legislative, in two chambers, senate and chamber of deputies, members of both elected by people. There are two vice-presidents, and ministry of six departments. Republic is divided into 8 departments, 55 provinces, 437 cantons, and 248 vice-cantons. State religion is R.C., though other faiths are tolerated. Head of church is archbishop, who lives at Sucre. Elementary education is compulsory. Military service compulsory. See MAP SOUTH AMERICA (S. W. PART)

BOLKHOV (53° 23' N., 35° 58' E.), town, Russia; manufactures leather, gloves, soap. Pop. 20,700.

BOLL, BOLE, measure used in Scotland and N. of England; held 6 imperial bushels; the 'new b.' held 2.

BOLLANDISTS, succession of Jesuit writers, so called after the first, John van Bolland, who (1643) compiled *Acta Sanctorum*.

BOLL WEEVIL. See COTTON BOLL WEEVIL.

BOLL WORM, a caterpillar (*Chloridea obsoleta*, or *Heliothis armiger*) which bores into flower buds and young bolls, causing them to drop; may be killed in young stages by Paris green.

BOLO, a weapon resembling a sword, or cutlass, peculiar to the Philippines. It is about 18 inches in length, slightly curved and from two to three inches wide. Though used in warfare with great skill in hand to hand fighting, it is more essentially a tool of domestic use, taking the place of an axe among agriculturalists of other countries. It is also used for cutting brush, harvesting rice and, above all, for cutting bamboo into the many articles of use for which that material is used. So dependent are the Filipino agricultural workers on this tool that they were allowed to have it in their possession universally, during the Spanish regime, though the carrying of all other kinds of arms was strictly forbidden.

BOLO CASE, THE. In Sept. 1917, Paul Bolo, a Fr. subject, otherwise known as Bolo Pasha (a title conferred on him by the ex-Khedive), was arrested in Paris on a charge of dealing with the enemy. His trial, early in 1918, was followed with eager interest by all Europe. It transpired during its course that over \$2,000,000 had been placed to his credit in America by the Deutsche Bank for the purpose of creating a movement of opinion favorable to the

enemy in the Fr. press; that he had endeavored to buy shares in the *Figaro* with this end in view; and that he had acted as intermediary between the Ger. government and the ex-Khedive in an endeavor to promote a pacifist movement. Bolo was found guilty, and shot as a traitor at Vincennes (April 17, 1918). His career is one of the most remarkable blends of rascality and charlatanism.

BOLOGNA. (1) Prov., Italy; wheat and maize largely grown. Area, 1,448 sq. m.; pop. 578,000. (2) Cap. of above (44° 29' N., 11° 21' E.); cathedral of San Pietro (rebuilt 1605); interesting old churches; two leaning towers, Torre Asinelli and Torre Garisenda (12th cent.) univ. (11th cent.).

BOLOGNA STONE, a variety of heavy spar or sulphate of barytes.

BOLOGNA, GIOVANNI DA (1524-1608), Fr. sculptor; lived chiefly in Italy; and assumed this Ital. name; was employed by Francesco and Cosimo de' Medici; fine examples of his work (e.g. *The Rape of the Sabinas*) in Florence.

BOLSHEVISM, pertaining to the Russian Communist Party. The name took its origin from the split which took place in the Russian Social-Democratic Party, which occurred in 1903, the larger faction being known as the 'bolsho,' meaning the majority, the minority being the 'menshe,' their partisans thenceforward being known as 'bolshevik' and 'menshevik.' The split was over principles which had brought about splits in the socialist parties in all other countries where the Socialist idea had a following. The original Marxian theory, based on so-called 'scientific' reasoning, was that through inevitable development the capitalists were daily growing richer, acquiring more and more of the wealth of the nations, while at an equal rate, the workers were daily becoming more impoverished. This process might be hastened or delayed by contributing causes, but the final crisis must be inevitable. Then, in sheer desperation, the workers would revolt, overthrow the capitalist system and assume control through the 'dictatorship of the proletariat,' which would continue until the proletariat, or working class, had absorbed all other elements of society, after which would come true socialism, based on a real democracy. This natural process of evolution, as it was supposed to be, could be hastened only by one form of effort; the workers must organize on the idea of 'class consciousness;' first of all they must strive to bring a realization of the fundamental

facts to all other workers; that the working class organization might be strengthened and developed; this organization must then prepare itself for the future responsibility which it must assume when the crisis came, the taking over the reins of government. There must, however, be no activities in politics, since the formation of political parties lead to relations with the capitalist state, and inevitably to compromise. Armed revolution was not a chief feature of this program, but it was recognized that when the disorders attending the crisis, the social revolution, came, it might be necessary to employ armed force to bring about the new social order. This was the main aspect of the Marxian doctrine, which the first disciples of Karl Marx accepted. As time passed, however, its impracticability grew more and more obvious to the less fanatical Socialists. For one thing, labor organization tended to check the tendency indicated, by improving the economic conditions of the workers. Liberal legislation also mitigated some of the abuses of the capitalist system. Middle class social reformers also brought about improvements which acted as a check. Gradually Socialists began to realize that if they did not associate themselves with these ameliorating causes, they would gain no popular support and remain limited to a few doctrinaire groups, too small in numbers to carry influence. Thus, first in Germany, political socialist parties were formed, demanding remedial legislation. These liberal socialists grew in number, and formed what is generally called the 'right wing.' In most European countries they were in a large majority before the Great War broke out, and most of them supported their governments in prosecuting the struggle. In Russia, however, the socialists had not come up against any practical experience, since there were no reforms. There was, in the first place, only a very small capitalist class. Absence of suffrage denied them experience in politics. For this reason the doctrinaire socialists were there in a majority. These were the 'bolshevik,' after the split, which occurred in Russia at a much later date than in other countries. At their head was Vladimir Illitch Ulyanov or, as he is better known, Nikolai Lenine. After the outbreak of hostilities his party was much depleted by desertions, for many found it impossible to resist the call of their country when it came to a war against their hereditary enemies, the Germans. Those that remained were mostly in Switzerland or other neutral countries. Throughout the war they remained consistently opposed to taking part, since it was their

theory that the war was nothing but a clash between the big capitalist interests in the various countries. But they continued active in spreading their propaganda where they could, proclaiming that the workers should not fight each other, but should join together and, as an international body, overwhelm capitalism. This propaganda passed unheeded during the first few years of the war, while yet national enthusiasm ran high. But eventually the tremendous strain on human morale began to manifest itself, in Russia first of all. Suddenly came the crash of the Russian autocracy, brought about, first by its own weakness, secondly by the stupidity of the man at the helm, Premier Stolypin. It was the patriotic Socialists, however, under Alexander Kerensky, who were able to take immediate advantage of the situation, they being on the ground. Thus they established a Socialist Republic, adapted to conditions. They realized the necessity of continuing the fighting with the Allies, until the Germans were decisively beaten, since German Imperialism was, after all, a greater danger than capitalism. This reasoning, however, was not apparent to the ignorant peasants forming the rank and file of the Russian Army. They welcomed the new government, truly, since they detested the autocracy. But they were sick of fighting. Kerensky exhorted them to continue fighting. For a while they responded. And then the Bolshevik propaganda began to circulate among them, meeting their deepest desire—an end to fighting. It was the grand opportunity of the Bolsheviks, and they made the most of it. Tons of literature were smuggled into the Russian lines. No doubt German money financed much of this, but if such leaders as Lenin were aware of it, it was most assuredly in no attitude of friendliness toward Germany. It was the reaction of the Russian soldier against warfare and the life in the trenches which brought about the downfall of the Kerensky Government. The Bolsheviks stepped into the breach, as it were, through no effort on their part. Thus, on November 7, 1917, they came into control of the ruins of the great Russian Empire; consisting of a handful of Marxian theorists, supported by the masses because they declared there would be no more fighting. The history of Bolshevism since that date is nothing but one continuous record of adaptation, the Bolshevik leaders, or Communists, as the original followers of Marx called themselves, having remained in power only through their long series of compromises between actual fact and their

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ports rubber, ivory. Pop. c. 3500.

BOMARSUND (60° 15' N., 20° 11' E.), town, Finland; formerly fortified; captured by French and English, 1854.

BOMB, a hollow explosive projectile ignited by a time fuse set in action on discharge, or by a percussion fuse operating on impact. In modern war, bombs are thrown by hand, fired from a rifle, or dropped from aircraft. First used with effect by Japanese at Port Arthur (1904). Aircraft bombs were constantly employed in the World War. There are two main classes: (1) high-explosive bombs, designed to damage works or personnel; and (2) bombs whose main object is the release of lethal or lachrymatory gas or of incendiary compounds, the former of which require a strong explosive to actuate them, and the latter only a light bursting charge.

BOMBARDIER BEETLE, beetle which when attacked ejects from anus evil-smelling fluid.

BOMBARDMENT is the attack on a fortress, town, or military position, by throwing explosive bombs into it. The object may be to destroy military stores, demolish fortifications, shake the morale of troops holding a position, or, in case of a town, terrorize the inhabitants into surrender. The introduction of high-explosive shells and heavy howitzers has made this a highly effective method of attack. Aeroplanes and observation balloons have also made bombardment even more effective than hitherto, and in the World War bombardments were carried out and ammunition expended on an unparalleled scale. It is probable that no town or fort of the old type could now hold out against determined and sustained bombardment. A new form of bombardment, known as barrage or curtain fire, developed during the World War, by which a zone of ground was so shelled as to become practically impassable. This method was also used for the protection of advancing infantry.

BOMBARDON, BASS TUBA, one of the saxhorns, a deep-toned musical instrument used in orchestras and military bands; for the latter use it is made in a circular form, and worn round the body.

BOMBAY, the cap. of Bombay Presidency, and second port of India (18° 55' N., 72° 54' E.), situated in S. of Isl. of same name, lying off coast of prov. and connected with mainland by bridges and causeways. In N. is native town; in S., European garrison; natives are of many different races;

chief religions, Hinduism, Mohammedanism. Bombay has some fine buildings, including a univ., the Victoria railway terminus, Ragabai Tower, municipal offices, several colleges, and large hospitals; most important manufacturing town in India; favorably situated for foreign trade; has magnificent natural harbor, wet docks, and many dry docks; railway communication with all parts of India; center of cotton trade; other industries are dyeing, tanning, metal work; imports and exports are practically those of presidency. The motto of the city is '*Primus in Indis*.' During the plague of 1896 every house had its victims, and nearly half a million of the survivors fled the city. It is extremely congested; seventy-six per cent. of the people live in one-roomed tenements. The Improvement Trust (est. 1900) does good work in reclaiming lands from the sea, opening out crowded localities, and constructing sanitary dwellings for the poor. Pop. 979,500.

BOMBAY PRESIDENCY, governorship, Brit. India (13° 53'-28° 29' N., 66° 40'-76° 32' E.); bounded N. by Baluchistan and Punjab, E. by Rajputana, Central India Agencies, Berar, and Hyderabad, S. by Madras and Mysore, W. by Arabian sea; coast-line towards N. broken by Gulfs of Cutch and Cambay; Narbada R., flowing to latter, divides prov. into two parts, of which northern consists of Gujarat and great plain of Sind, southern of coastal strip along Arabian Sea and part of Deccan tableland; chief mountains are W. Ghats, Satpura range, and outliers of Aravalli Hills; rivers, Indus (which traverses Sind), Narbada, Tapti.

Climate varies; high temp. in Sind plains; rainfall slight in N., moderate on tableland; heavy on coastal strip; wettest months, June to October; chief crops are wheat, cotton, millet, rice; other products are pulse, oilseed, sugar-cane, indigo, tobacco; principal industries, cotton manufacture, silk-weaving, carpets, leather goods, pottery, brasswork, wood-carving, cutlery, jewelry; minerals include gold, iron, Railway mileage, principal lines, c. 10,000 m. Administration carried out by governor, who is assisted by executive council of three members and legislative council of 43 members; the population includes Europeans, Maharrattas, and other races; majority are of Hindu religion, Mohammedanism coming next in numerical importance. Area (including feudatories and the dependency of Aden), 186,923 sq. m.; pop. 27,084,000.

History.—Between late 15th and early 17th cent. settlements were made in Bombay by Portuguese, Dutch and

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English, of whom Portuguese first appeared. Bombay I. passed to England when Charles II. married Catherine of Braganza in 1661, and was subsequently granted to East India Company in 1668; other districts were added at various dates, and following successful wars against the Mahrattas, Governor Elphinstone (1819-27) organized the province; has frequently suffered from plague. See MAP CENTRAL AND S. ASIA.

BOMBELLES, MARC MARIE, MARQUIS DE (1744-1822), Fr. diplomatist; later, bp. of Amiens.

BOMBING MACHINES. A heavy type of aeroplane used for carrying and dropping bombs. They were first developed during the European War of 1914-18, and reached a high degree of efficiency. The early machines used by the Germans for dropping bombs on French and English cities were nothing more than the ordinary military aeroplanes put to particular use, but in the later years of the war both sides built machines specially designed for carrying great weight and equipped with devices for enabling the crew to drop the bombs with ease and accuracy. Among the allies, the two largest bombing machines were the Handley Page and the Caproni. The former was driven by four Rolls-Royce engines, each of 300 horse power. It carried sufficient fuel for ten hours flight and traveled at a speed of 80 miles per hour. Shortly after the armistice one of these planes flew over London carrying forty passengers. The Caproni triplane was equipped with three Fiat engines, each of 600 horse-power, and was capable of carrying three tons of bombs. It was used by the Italians in raids on Pola and Trieste. Other smaller types of bombers used by the allies were the Caudron, the Breugnot, the A. V. Roe, the Letord, and the Morane-Saulnier. Among the most famous of the German bombers were the Gotha, the Friedrichshafen, the Lizenz and the A. E. G. The first was of the 'pusher' type, was built of wood, and was equipped with twin 500 horse-power engines. It carried a crew of three men. The A. E. G. was the latest type of German bombing machine. Its framework was of steel tubing, its span 60 feet, and its speed 90 miles per hour. It was equipped with twin Mercedes engines of 260 horse-power. The Lizenz had a span of 140 feet, could carry nine men and 2000 lbs. of bombs. At the time of the armistice Germany possessed 200 bombers. In addition to the mechanism for releasing the bombs, the machines were equipped with Goerz sights, to enable the operator to aim. Other special equipment used on both

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sides consisted of flares, ignited, when dropped by the resistance of the air, which were used to illumine the object of attack. They were capable of producing from 300-400 candle-power. Special bombs, containing 60 per cent of their weight of explosives, were also developed, the ordinary artillery shells containing only about 5 per cent of explosive.

BONA, BÔNE (36° 55' N., 7° 42' E.); port. Algeria; quasi-Byzantine cathedral, Grand Mosque, and citadel; fine harbor; exports phosphates, sheep, barley, iron, etc.; imports manufactured articles; occupied by French, 1830, 1832. Pop. 45,000.

BONA DEA (classical myth.); Rom. goddess of fruitfulness.

BONA FIDES (Lat. 'good faith').—The b. f. of defendant is an equitable consideration which entered largely into Rom. law and modern codes founded thereon. To obtain alcoholic liquors on Sunday in Scotland; or in certain hours in Eng., persons must be *b. fide* travelers (i.e. have traveled from three miles distant that day).

BONA, GIOVANNI (1609-74), Ital. cardinal and author; wrote numerous devotional and liturgical books; his *Manuductio ad Coelum* (Guide to Heaven) was translated into English by L'Estrange, 1680 (new ed., 1898).

BONAIRE ISLAND (12° N., 68° 50' W.), island, Dutch W. Indies. Pop. 6000.

BONANZA (Span. 'prosperity'); colloquial expression in Amer. mining districts for anything profitable.

BONAPARTES, BUONAPARTES (It. form).—The Bonaparte family consisted of: Charles Bonaparte (1746-85), *f.* of Napoleon I., descendant of Ital. family settled in Corsica; occupied position at court of Ajaccio; m. (1764) Letizia Ramolino, a good *bourgeoise* to whom Napoleon was devotedly attached; as 'Madame Mère' in the Tuileries, she obstinately made economies against the evil days which she knew would come; she followed Napoleon to Elba, and d. 1836. Napoleon I. (*q.v.*) was the second son (b. 1769); he had 4 bro's and 3 sisters, whom he treated with culpably magnificent generosity. He once said bitterly: '*On dirait que j'aurais mangé l'héritage de notre père*'—Joseph (1768-1844), eldest bro. of Napoleon I., d. Corte, Corsica; became councillor of Ajaccio municipality; fled to France on victory of Paolist party; app. minister to court of Parma (1797); subsequently one of members for Corsica in Council of Five Hundred; king of Naples (1806-

8); king of Spain (1808-13). In Spain he endeavored to thwart Napoleon, but was little more than nominal king, and retired from Madrid after his defeat at Vittoria (1813); he was lieutenant-general of France (1814); subsequently settled in U.S.A. as Comte de Survilliers; d. at Florence.—Lucien (1775-1840), Prince of Canino; Napoleon's ablest bro.; espoused democratic movement (1789); subsequently pres. of Council of Five Hundred and Minister of Interior (1799); ambassador to Madrid (1800); estranged from Napoleon (1803); lived for some years in Italy; offered Napoleon his help during the Hundred Days; d. at Rome. His eldest s., Charles Lucien Jules Laurent, went to America, and is famous for his *Amer. Ornithology*; his younger s., Louis Lucien (1813-91), was authority on Celtic speeches.—Louis (1778-1846), Napoleon's favorite bro., educated by Napoleon, at the cost of much privation, from his lieutenant's pay; accompanied Napoleon during Ital. campaign (1796-97); became general (1804); gov. of Paris (1805), king of Holland (1806). Napoleon declared Holland an integral part of Empire (1810); Louis fled to Bohemia. His s. afterwards became Napoleon III. f. of Eugene Louis Jean Joseph (b. 1856-79), 'Prince Imperial,' slain by Zulus.—Jerome (1784-1860), king of Westphalia (1807-13); m. Catherine of Württemberg; commanded a division of Fr. army at Waterloo; subsequently a marshal of France and pres. of Senate.—The *affaires galantes* of Napoleon's sisters were matters of European scandal. Elisa (1777-1820), m. Felix Baciocchi, a well-connected Corsican (1797); made Grand Duchess of Tuscany and Princess of Lucca and Piombino by Napoleon.—Pauline (1780-1825), Princess Borghese (1803), Napoleon's second and most beautiful sister; Duchess of Guastalla (1808-13).—Caroline (1782-1839), m. Joachim Murat, king of Naples (1803-13), and devoted herself to furthering his interests.

All the above had issue, many of whom achieved distinction. The Bonapartes of Baltimore are descended from Jerome Bonaparte by his marriage with Elizabeth Patterson (1803).

By his second w., Marie Louise, Napoleon had a s., the little king of Rome, afterwards recognized as Napoleon II. Napoleon's stepdaughter, Hortense de Beauharnais, m. his brother Louis, father of Napoleon III.

BONAPARTE, CHARLES JOSEPH (1851-1921), son of Jerome Napoleon and Susan May Williams Bonaparte. Grandson of Jerome Bonaparte, king of Westphalia the younger brother of

Napoleon. Graduated at Harvard in 1871 and from Law School in 1874. Practised law in Baltimore, Md. President Roosevelt appointed him Attorney-General in his Cabinet in 1906.

BONAR, HORATIUS (1808-89), Scot. Presbyterian theologian, author of well-known hymns.

BONASA GROUSE (*Bonasa umbellus*), N. Amer. grouse, recognized by absence of feathers from toes and lower leg, and by black neck-ruffs.

BONAVENTURA, ST. (1221-74), Ital. Franciscan theologian; studied at Paris; general of Franciscan order, 1256; called 'The Seraphic Doctor'; canonized 1482. A mystical theologian, he opposed the Aristotelianism of Roger Bacon and St. Thomas Aquinas and showed platonizing tendencies; a profound philosopher and theologian.

BONCHAMP, CHARLES MELCHIOR ARTUS MARQUIS DE (d. 1793), Vendéen leader; served in Fr. army, but retired on outbreak of Revolution; became leader of Vendéen insurgents (1793), and was killed at battle of Cholet.

BOND, a written instrument, signed and sealed by a person who is called the obligor, by which he acknowledges that he owes a certain sum of money to another, or that he is bound to do some act for the benefit of that other, who is called the obligee. Money due under a b. can be recovered within twenty years after it has become due, whereas in the case of simple contract debts, the right to recover is barred at the end of six years from the last acknowledgment in writing of the debt, or the last payment of any portion of the principal or interest.

BOND, SIR EDWARD AUGUSTUS (1815-98), Eng. librarian; entered Brit. Museum (1838); app. chief librarian (1878); one of the founders of the Paleogeographical Soc.; edit. a series of Anglo-Saxon charters.

BOND, SIR ROBERT (1857), Prem. Newfoundland, 1900-9; prominent in Fisheries disputes.

BOND, WILLIAM CRANCH (1789-1859), Amer. astronomer; introduced astronomical photography, discovered 8th satellite of Saturn (1848), invented astronomical chronograph.

BONDE, GUSTAF, COUNT (1620-67), Swed. statesman; became Lord High Treasurer (1659), and member of council of regency during minority of Charles

XI.; favored pacific and economic policy in national affairs but overborne by colleagues.

BONDED WAREHOUSE, a government store or custom-house store where imported goods are lodged, pending re-exportation or until the duties chargeable thereon are paid on removal. The system of bonded warehouses (proposed in Walpole's Excise Scheme, 1733) was not adopted till 1803.

BONDI, CLEMENTE (1742-1821); Ital. poet, priest, prof.; chief work, the poem, *La giornata villereccia*, resembles Lamartine's style.

BONDU (14° N., 13° W.); native kingdom, Fr. Senegal, W. Africa; well cultivated; people chiefly Fula; cotton, tobacco. Pop. c. 30,000.

BONE is the hard substance of which the skeletons of animals is built up, serving as a framework for the body and for the protection of vital parts, and is a connective tissue in which earthy salts have been deposited in order to strengthen the structure. B's are classed as *long* (e.g.), in thigh, *flat*, (e.g.), in skull, and *cutical* or *irregular* (e.g.), in wrist. The animal or organic matter amounts in b. to about one-third of the whole, and the earthy or organic matter, in the form of salts, to about two-thirds. According as it is dense and hard in structure, or light and spongy, b. is called *compact* or *cancellous*. On microscopic examination b. is found to be formed by innumerable little canals, running longitudinally in a long b., each containing blood vessels, and their walls formed by a series of rings of bony substance. Filling the spaces in b. is marrow, composed of fat cells, and of the same corpuscular elements as are found in the blood (q.v.), but in a less advanced stage of development; there are two kinds of marrow, yellow and red, the former being found in the interior of long bones (e.g.), the thigh bone, and the latter in smaller long bones (e.g.), the ribs, and in short bones (e.g.), vertebrae. Yellow marrow has a much greater number of fat cells, hence its color, while red marrow is almost entirely composed of the other cellular elements, from which the blood corpuscles are formed. B. is formed from cartilage or from membrane, usually the former, little points of bony cells developing and the area then spreading.

Inflammation may affect the covering of the b. or *periosteum*, the b. itself, or the substance in the canal within, or *medulla*. It may be acute or chronic, the acute form usually being due to injury followed by bacterial infection, and the chronic to the continued suppuration

of acute form, to syphilis, and to tuberculosis. The former is usually treated by rest and fomentations, operation being sometimes necessary, and the latter by general treatment of the disease affecting the individual.

Fractures are treated by rest in splints, and massage, begun early.

Rickets is a general disease of children, with special manifestations in the bones.

BONE ASH, formed from calcined bones; used for fertilizing and in manufacture of cupels.

BONE MANURES consist mainly of phosphate of lime and ammonia.

BONE, HENRY (1755-1834), Eng. enamel-painter; private and hist. portraits and classical subjects.

BONER, ULRICH (XIV. cent.), Swiss fabulist; author of a collection of fables, *Der Edelstein*, written in Middle High German; edit. by G. F. Benecke (1816).

BONESET, an annual plant, native to the United States. It has a tall stem, four to five feet in height, which is surmounted by a small flat head of light purple flowers. It was formerly much used as a domestic medicine in the form of an infusion, and was supposed to have tonic qualities.

BONNESS, BORROWSTOUNNESS (56° 1' N., 3° 36' W.), seaport, Firth of Forth, Scotland; extensive harbor; large shipping trade; coal, iron, salt, soap. Pop. 10,866.

BONFIRE, a corruption of 'bone-fire,' a fire for burning bones, which spelling was employed in England as late as the latter part of the XVIII. cent., though the alternate spelling had been some time in use. B's were formerly lit in England as beacons, or warnings; the approach of the Armada was so notified to the people. At the present day they are lighted on occasions of national rejoicing.

BONGARS, JACQUES (1554-1612), Fr. diplomatist; edit. works on Fr. and Rom. history.

BONGHI, RUGGERO (1828-95), Ital. politician and educationalist; as Minister for Public Instruction (1873) introduced useful reforms; celebrated for his vivacious but acrimonious wit.

BONGO, negro tribe of Sudan, of medium height, black-haired with a reddish-brown complexion, peaceable and industrious agriculturists.

BONHAM, a city of Texas, the county seat of Fannin co. It is on the

Texas and Pacific and the Missouri, Kansas and Texas railroads, and on the Red River. It is the center of an important agricultural and cotton raising district, and has a large trade in cotton, grain and live stock. Here is Carleton College. The industries of the city include flour mills, cotton and cottonseed oil mills, railroads machine shops, etc. Pop. 1920, 6,008.

BONHEUR, ROSA (1822-99), Fr. artist; was of Jewish parentage; originally a dressmaker; famous for her masterly painting of animals. Her work was highly appreciated in England. *The Horse Fair* is in the Metropolitan Museum of Art, New York.

BON HOMME RICHARD, a famous American warship in which John Paul Jones fought the naval duel with the British ship *Serapis* on Sept. 23, 1779, off Flamborough Head, after his descent upon the Scottish Coast. After capturing the *Serapis* Jones found his own vessel, the *Bon Homme Richard*, so badly battered by the shots of the *Serapis* that he transferred his flag to that ship. The *Bon Homme Richard* sank shortly afterwards.

BONI (4° 40' S., 120° E.), native state, Celebes, Dutch East Indies; inhabitants of Bugis race; rice, tobacco; capital, Boni. Pop. c. 70,000.

BONI, GIACOMO (1859), famous excavator of Rom. remains, especially in Forum at Rome; author of works on Rom. antiquities.

BONIFACE V., pope, 619-25; said to have made Canterbury chief Eng. see.

BONIFACE VIII., BENEDICT CAJETAN, pope (1294-1303), upheld temporal power; quarrelled with several kings; issued bull, *Clericis Laicos*, 1296, forbidding taxation of clergy; captured by Fr. king at Anagni; imprisoned, and died on release.

BONIFACE IX., a Pope who was elected to the office in 1389. He was born in Naples of noble family and became a cardinal in 1381. He died in 1404.

BONIFACE, ST. (680-754), 'Apostle of Germany'; of Eng. birth; began missionary labors in Frisia, 716; founded abbey of Fulda and churches in Bavaria and Franconia; became abp. of all Germany; martyred. To him the conversion of Germany was really due.

BONIFACE OF SAVOY (d. 1270), abp. of Canterbury, 1243; uncle of Eleanor of Provence, Henry III.'s wife.

BONIN ISLANDS (27° 45' N., 142° E.), volcanic islands, N. Pacific, be-

longing to Japan; capital, Port Lloyd, on Peel Island, the largest of the chain; discovered by Japanese, 1593.

BONITO, a fish belonging to the family of mackerels. It is closely allied to the tunny fish. It is found in the Mediterranean, where it preys on the flying fish.

BONIVARD, FRANÇOIS (1493-1570) Cluniac prior of Geneva, hero of Byron's *Prisoner of Chillon*; being imprisoned there for six years by order of Charles III. of Savoy, released when Chillon fell into hands of Bernese, 1536; took refuge at Geneva, accepted the Reformation, and wrote *Chroniques de Geneve*, an unscholarly production.

BONN (50° 44' N., 7° 4' E.), town, Prussia, on Rhine; Minster is Romanesque church, dating from XI cent.; famous univ., established 1808; building was formerly electoral palace; has five faculties, antiquarian museum, and library; fine bridge across Rhine; behind town is Kreuzberg, with monastic church; Beethoven's birthplace. Pop. 87,978.

BONNER, GERALDINE (1870) daughter of John and Mary Sewell Bonner. Removed to West in 1880, finally settling in San Francisco, Cal. Began writing for the San Francisco Argonaut in 1887 and later became its dramatic critic. Among her numerous works of fiction are *Tomorrow's Tangle*, 1902; *The Pioneer*, 1905; *The Castle-court Diamond Case*, 1906; *Rich Men's Children*, 1906; and *The Emigrant Trail*, 1909. Also wrote many short and serial stories for the leading magazines. As a dramatist she is represented by *The Book of Evelyn*, 1913; *The Girl at Central*, 1914; *The Black Eagle Mystery*, 1916; and *Miss Maitland*, *Private Secretary*, 1919.

BONNER, ROBERT (1824-1899), b. in Ireland. He was brought in early youth to the United States and was first apprenticed to a printer. Removed to New York in 1844 and by 1851 was able to purchase the New York Ledger, then an insignificant paper. By his untiring efforts he built up the publication until it became one of the best paying newspapers in the city. He became in later life much interested in trotting horses and owned some of the most famous trotters in the world, among them being Dexter and Maud S. He was widely known for his many charitable donations and benefactions.

BONNET, CHARLES (1720-93); Swiss naturalist and author; made special study of insect life; advanced theory that plants possess sense of dis-

cernment; also formulated a system of philosophy.

BONNEVILLE, BENJAMIN (1795-1878), Am. soldier and explorer; explored the Rocky Mountains (1831-36); an account of his adventures was edit. by Washington Irving. He subsequently served in the Mexican and Civil Wars.

BONNEVILLE LAKE, formerly a lake in Utah which filled a large basin, which is now a desert. It had an area of 80,000 square miles. It is estimated to have been 1,000 feet deep.

BONNIVET GUILLAUME GOUFIER, SEIGNEUR DE (1488-1525), Fr. soldier; ed. with Francis I., with whom he remained a favorite; admiral, 1515; commanded the army of Navarre, 1521; served in Italy, 1523-25, and was killed at *Pavia*. He was the implacable foe of the Constable de Bourbon; famed for his wit, his handsome person, and licentious life.

BONNY.—(1) (4° 30' N., 7° 23' E.) port, Nigeria. Pop. c. 20,000. (2) (5° 16' N., 7° E.) river, Nigeria.

BONPLAND, AIMÉ (1773-1858), a French botanist, born in Rochelle. While studying in Paris he became acquainted with Alexander von Humboldt, and accompanied him to the United States. During this expedition he collected over 6,000 plants which were before unknown. On his return to France in 1804 he was made director of the gardens of Navarre and Malmaison. He afterwards went to South America and became professor of natural history at Buenos Aires. He carried on important explorations in South America and finally settled in Brazil, where he died.

F BONSAI, STEPHEN (1865), son of Stephen and Frances Leigh Bonsal. Educated at St. Paul School, Concord, and at Heidelberg, Bonn and Vienna, as correspondent in Bulgaria, Servia, Chino-Japanese and Spanish-American wars. Attached to China Relief Expedition in 1900. Saw much service in Central and South American countries. Was secretary of legation in Peking, Tokio, Korea and Madrid from 1891 to 1896. Commissioner of Public Utilities, Philippine Islands in 1914. With American Expeditionary Force during World War, and attached to American Commission at Peace Conference at Paris, in 1919. Besides contributing shorter articles to the leading magazines, is author of *The Real Condition in Cuba*, 1897; *The Golden Horse Shoe*, 1900; and the *American Mediterranean*, 1912.

BONSTETTEN, KARL VICTOR VON (1745-1832), Swiss author; held

advanced liberal opinions which sometimes involved him in difficulties with the authorities, but won for him the regard of many distinguished people, including the Eng. poet, Gray, and Mme de Staël. His best-known work is *L'Homme du midi et l'homme du Nord*, 1824.

BONUS. See **BOUNTY. SOLDIERS' BONUS.**

BONY FISHES, TELEOSTEI, by far the greater number of existing fishes, are grouped together in this order, containing about 10,000 species, including such diverse forms as salmon, herrings, eels, pike, cod, sea-horses, and globe-fishes. The most apparent character which unites the infinite variety of Teleosts is the presence of a skeleton of true bone, as the scientific name indicates. There are many other less evident but as distinctive characters; the tail is altogether formed of what is, in more primitive fishes, only the ventral lobe, which here assumes a false appearance of symmetry (homocercal). The heart has a non-contractile arterial bulb, the optic nerves cross, but do not interlace (decussate), there is no spiral valve in the intestine, and the air-bladder, except in very rare cases, has ceased to be used in respiration. For the most part bony fishes are protected by thin, overlapping scales, but in some there are bony plates, and in some the skin is naked. Teleosts are among the most modern of fishes, but herring-like examples have been found in rocks of Jurassic Age.

BOOK (A.S. *doc*; Ger. *buch*), the name formerly applied to any written tablet or document; now used to describe a printed literary work, stitched and bound; also the division of such a work, as 'Book II.' of *Paradise Lost*. A modern printed b. is described according to the size of its pages, which size is governed by the number of times a single sheet of printing-paper (*folio*) is folded. Thus a folio b. consists of sheets folded once, forming two leaves, or four pages; in a *quarto* the sheet is folded twice (four leaves eight pages); in *octavo* it is folded three times (eight leaves, sixteen pages), and so on down to smaller sizes. The most common size to-day is *crown octavo* (Cr. 8 vo), which is the size of the usual popular novel, and many other b's; while a favorite smaller size is that known as *foolscap octavo* (Fcp. 8vo), which is often used for b's of verse, and with uncut leaves of *deckle-edged* (untrimmed paper).

The first page of a printed b. is called the *recto*, and usually contains the bare title, or, if it is a long and elaborate one, a portion only, and is known as the

half-title page. The back of it is usually left blank, and is called the *verso*. Then follows the *title-page* proper, bearing the year of publication, though there is a growing tendency at present to print the date on the back of the title-page, as thus: 'First printed in 1912.' The title-page is followed in proper order by the dedication, preface, and contents pages. In early printed b's the name of the printer and the date and place of publication were inscribed at the end of the b.; this appendix (containing sometimes a note as to the nature of the b.) was called the *colophon*. In early printed b's the leaves were not numbered, the pioneer in leaf numeration being a Cologne printer who first made use of it in about the year 1470, while pagination was a product of the XVI. cent. See Duff's *Early Printed Books* (1893); Jacobi's *Some Notes on Books and Printing* (1902). See СЕНСОВАНИИ.

BOOKBINDING, the art of making up a book by fastening together the sheets and providing them with an outer cover to protect them. Before the invention of printing, manuscript books were both written and bound by monks, but when printing presses became established towards end of XV. cent., bookbinding became a separate art in which Italy took the lead. In XVII. cent. Fr. binding became prominent, and during early XIX. cent. Eng. binding reached a high position which it still maintains. Books are bound in either leather or cloth, the latter being less strong, but cheaper. The binder folds the sheets which come from the printer into two, four, or eight leaves according as the book is folio, quarto, or octavo, and arranges these in the proper order as indicated by letters, called signatures, printed at the bottom of the first page of each sheet. The sheets are then pressed and saw-cuts made across the back to take the cords with which they are stitched. The back is then hammered and pressed to round it and to form side projections, called joints, to hold the case. In cloth binding the case, consisting of two pieces of mill-board joined by a strip of paper to form the back, is then attached.

BOOKKEEPING, the method of recording business transactions which enables a person engaged in any pursuit involving trade with other persons to know the resulting financial condition of his trading. An efficient system of bookkeeping is absolutely necessary for the proper operation of any establishment spending and receiving money or giving and receiving credit in the conduct of its affairs. In manufacturing or merchandizing it will disclose the condition of any account, whether it be to the

credit or debit of the person or persons concerned, the sources of all expenses and receipts, the basic capital and its disposition, and, finally, its multitude of items should be so organized in entries that a concise statement can be prepared clearly showing the profit or loss resulting in any period of transactions and the stability or otherwise of the business. The smaller a business is the more simple the method of bookkeeping practised, and the system known as single entry suffices. It is less troublesome than double entry, but applied to a business that is growing out of the simplicity of single transactions of buying and selling with persons only, it affords no check on fraud or against errors or omissions in keeping accounts. The books commonly used for single entry are a day book and ledger. Sometimes the order book of original entry serves as the day book for debtor entries on the ledger, while bills and invoices do duty as the basis for creditor entries. Payment for goods by a customer, of course, produces an entry in the daybook and ledger cancelling his indebtedness, and payment by the proprietor for stock and other goods call for a similar entry to his credit in the accounts he keeps with firms who supply his needs. Single entry furnishes no data for the familiar balance sheet evolved from double entry, nor for delving into the sources of profit, loss, and cost and other instructive information. Double entry does this; as its name implies, it records both elements of a transaction (there are always two), while single entry registers only one. The simplest system of double entry calls for a day book, a journal and a ledger. The daybook records fully each business transaction as it happens; on the journal the debit and credit items arising out of the transaction are entered, and the ledger entries classify them. The journalizing of transactions admit of many divisions, in fact, in many businesses it spreads over a set of books, one for purchases, one for sales, and one for cash transactions. The ledger duly gets all the entries made in them by postings. A Goods Account (not known in single entry) gets credited with all sales of goods and debited with all purchases of goods. Other books kept are the Bill Book, recording bills receivable and payable; wages book; petty cash book. In the ledger appears Personal Accounts, that is, for each creditor and debtor of the business; Real Accounts, embracing various classes of property; and Nominal Accounts, including wages, rent, interest and discount. The ledger enables a trial balance to be made; this is simply debit and credit columns giving the balances of all accounts in the ledger,

and the two totals should balance. Revenue accounts are also periodically prepared from the ledger records, classifying the various items of loss and gain and showing the condition of a business, whether profitable or otherwise. In the expenses of a merchandising business a revenue account would show the cost of buying and selling goods and the overhead cost of the establishment's upkeep. In manufacturing, the cost of making the goods figures as well.

BOOK-LICE, or DUST-LICE, DEATH-WATCHES (*Psocidae*), a separate order of insects (till recently included in Neuroptera); with small soft bodies, and with or without wings. Two genera, *Clothilla* and *Atropos*, to be seen running actively in quiet apartments, eat the starch paste in bookbindings and are said to cause the nocturnal ticking which is alleged to portend death. A beetle, *Anobium*, produces a somewhat similar noise.

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BOOM (51° 5' N.; 4° 22' E.); town, Belgium. Pop. 13,500.

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BOONE, a city of Iowa, the county seat of Boone co. It is on the Chicago and Northwestern, the Chicago, Milwaukee and St. Paul, and other railroads, and is 36 miles northwest of Des Moines. The city is an important coal mining center and its industries include the manufacture of flour, brick, tile and pottery, and the mining and shipping of coal. Pop. 1920, 12,451.

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half-title page. The back of it is usually left blank, and is called the *verso*. Then follows the *title-page* proper, bearing the year of publication, though there is a growing tendency at present to print the date on the back of the title-page, as thus: 'First printed in 1912.' The title-page is followed in proper order by the dedication, preface, and contents pages. In early printed b's the name of the printer and the date and place of publication were inscribed at the end of the b.; this appendix (containing sometimes a note as to the nature of the b.) was called the *colophon*. In early printed b's the leaves were not numbered, the pioneer in leaf numeration being a Cologne printer who first made use of it in about the year 1470, while pagination was a product of the XVI. cent. See Duff's *Early Printed Books* (1893); Jacobi's *Some Notes on Books and Printing* (1902). See CENSORSHIP.

BOOKBINDING, the art of making up a book by fastening together the sheets and providing them with an outer cover to protect them. Before the invention of printing, manuscript books were both written and bound by monks, but when printing presses became established towards end of XV. cent., bookbinding became a separate art in which Italy took the lead. In XVII. cent. Fr. binding became prominent, and during early XIX. cent. Eng. binding reached a high position which it still maintains. Books are bound in either leather or cloth, the latter being less strong, but cheaper. The binder folds the sheets which come from the printer into two, four, or eight leaves according as the book is folio, quarto, or octavo, and arranges these in the proper order as indicated by letters, called signatures, printed at the bottom of the first page of each sheet. The sheets are then pressed and saw-cuts made across the back to take the cords with which they are stitched. The back is then hammered and pressed to round it and to form side projections, called joints, to hold the case. In cloth binding the case, consisting of two pieces of mill-board joined by a strip of paper to form the back, is then attached.

BOOKKEEPING, the method of recording business transactions which enables a person engaged in any pursuit involving trade with other persons to know the resulting financial condition of his trading. An efficient system of bookkeeping is absolutely necessary for the proper operation of any establishment spending and receiving money or giving and receiving credit in the conduct of its affairs. In manufacturing or merchandizing it will disclose the condition of any account, whether it be to the

credit or debit of the person or persons concerned, the sources of all expenses and receipts, the basic capital and its disposition, and, finally, its multitude of items should be so organized in entries that a concise statement can be prepared clearly showing the profit or loss resulting in any period of transactions and the stability or otherwise of the business. The smaller a business is the more simple the method of bookkeeping practised, and the system known as single entry suffices. It is less troublesome than double entry, but applied to a business that is growing out of the simplicity of single transactions of buying and selling with persons only, it affords no check on fraud or against errors or omissions in keeping accounts. The books commonly used for single entry are a day book and ledger. Sometimes the order book of original entry serves as the day book for debtor entries on the ledger, while bills and invoices do duty as the basis for creditor entries. Payment for goods by a customer, of course, produces an entry in the daybook and ledger cancelling his indebtedness, and payment by the proprietor for stock and other goods call for a similar entry to his credit in the accounts he keeps with firms who supply his needs. Single entry furnishes no data for the familiar balance sheet evolved from double entry, nor for delving into the sources of profit, loss, and cost and other instructive information. Double entry does this; as its name implies, it records both elements of a transaction (there are always two), while single entry registers only one. The simplest system of double entry calls for a day book, a journal and a ledger. The daybook records fully each business transaction as it happens; on the journal the debit and credit items arising out of the transaction are entered, and the ledger entries classify them. The journalizing of transactions admit of many divisions, in fact, in many businesses it spreads over a set of books, one for purchases, one for sales, and one for cash transactions. The ledger duly gets all the entries made in them by postings. A Goods Account (not known in single entry) gets credited with all sales of goods and debited with all purchases of goods. Other books kept are the Bill Book, recording bills receivable and payable; wages book; petty cash book. In the ledger appears Personal Accounts, that is, for each creditor and debtor of the business; Real Accounts, embracing various classes of property; and Nominal Accounts, including wages, rent, interest and discount. The ledger enables a trial balance to be made; this is simply debit and credit columns giving the balances of all accounts in the ledger,

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BOOTH, BALLINGTON (1859), son of William and Catharine Booth. His father was the founder of the Salvation Army. He early identified himself with the Salvation Army and in 1885 was given the command of the branch in Australia. Came to the United States in 1879 and from then until 1896 was in command of the Salvation Army. In this year he withdrew from the Salvation Army and formed an independent religious organization known as the Volunteers of America. Has since been its general-in-chief and president. He was ordained into the ministry in 1896.

BOOTH, BARTON (1681-1733), Eng. actor; ed. Trinity Coll., Cambridge; played at the Haymarket and Drury Lane theatres; buried in Westminster Abbey.

BOOTH, CHARLES (1840-1916), Eng. sociologist; chairman of the Booth Line of steamships; has devoted much time and money to social questions; author of *Life and Labour of the People in London* (1891-1903); P.C. (1904); F.R.S., etc.

BOOTH, EDWIN THOMAS (1833-93), Amer. actor. He made his first appearance at Boston (1849). After years of struggle, by means of his striking personality, and the charm of his elocution, he became generally recognized as the greatest Shakespearean actor the Amer. stage has produced. In his later years he alternated the chief parts in *Othello* with Sir Henry Irving, at the Lyceum. Undertook short engagement with Salvini in New York (1886), and following year formed combination with Lawrence Barrett that lasted till Barrett's death (1891). Apart from the high quality of his acting, he was remarkable for his artistic taste and his lavish generosity.

BOOTH, JAMES CURTIS (1810-88), Amer. chemist, established at Philadelphia the first laboratory in the U.S. for instruction in analytical chemistry; was the first to introduce nickel as an alloy in the U.S. coinage.

BOOTH, JOHN WILKES (1839-65), Amer. actor, left the stage in 1863, and became a Secessionist plotter. He shot President Lincoln, April 14, 1865, and refusing to surrender, was himself shot.

BOOTH, JUNIUS BRUTUS (1796-1852), he received a classical education and at the age of seventeen he entered upon his stage career. His first pronounced success was in Richard III., played at Covent Garden, London. In 1821 he came to the United States and from his first appearance he acted with great success.

BOOTH, MAUD BALLINGTON (1865), daughter of Rev. Samuel and Maria Charlesworth Booth. Educated at Belstead, Eng., and in Switzerland. Married Ballington Booth in 1886. Came to the United States in 1887 and from then until 1896 was prominent in the activities of the Salvation Army. She aided her husband greatly in organizing his new work, the Volunteers of America. Is in charge of extensive prison work throughout the United States. She is the author of the following works: *Branded* (1897); *Lights of Childhood* (1901); *After Prison What?*; *Twilight Fairy Tales* (1906).

BOOTH, WILLIAM, 'GENERAL' (1829-1912), Eng. home missionary; resigned ministry in Methodist New Connexion (1861) and in 1865 established the Christian Mission, out of which developed the Salvation Army, in the East End of London. Booth as 'General' was granted almost absolute power, and became one of most prominent individuals of Eng. life, as his Army had become feature of almost every British town and village, besides spreading almost over the whole world; costume is navy blue serge uniform, blue cape for men, and blue straw for the familiar Salvation Army 'lasses.' The teaching is emotional Christianity, doctrinally broad; they earnestly fight 'the drink,' and are noted for their patience with apparently hopeless drunkards and jail-birds. Booth organized Rescue, Maternity, Prison-gate, and Children's Homes, Slum Posts, Shelters for Homeless, Food Depots, Labor Bureaux, and Farms at home and abroad. In this social work the Army has proved especially successful. He wrote *In Darkest England and the Way out* (1890).

BOOTH, W. BRAMWELL (1856), eldest son of above; succeeded his father (1912) as general of Salvation Army; presided at International Congress in London (1914). A masterly organizer; is author of several religious pamphlets and books.

BOOTHBY, GUY NEWELL (1867-1905), novelist; born in S. Australia; lived for many years in England, and there wrote his well-known sensational novels, including *The Beautiful White Devil*, *Dr. Nikola*, etc.

BOOTHIA, FELIX (70° N., 96° W.); peninsula, N. America; discovered by Sir John Ross (1829-33); contains Magnetic Pole.

BOOTLE (53° 27' N., 3° W.); town, Lancashire, England; practically part of Liverpool. Pop. 1921, 77,800.

BOOTS

BOOTS, covering for the foot. The ancient Greeks wore sandals, as did the Roman plebeians, but the Roman patricians wore leather b's. The Early Britons probably wore sandals, and, in later times, b's made of skins. The b. first became prominent in England when a fashion was introduced, during the reign of Edward IV., of wearing b's with such ridiculously long points that they had to be supported by light chains depending from below the knee. In Early Tudor times an ugly broad-toed b. was worn by men, as may be seen in pictures of the period. During the reigns of Charles I. and II. b's with bag-like open tops were the fashion. After these came the *Jack-b.*, the *Hessian* and the *Wellington b.* Buckled ankle shoes were also commonly worn from the time of the Early Stuarts. In Georgian days they were worn with high, red heels. One of the chief centers of the modern b. industry is Northampton.

BOOTS AND SHOES. The manufacture of footwear is a leading American industry, mainly centered in New England, where it became established with the first colonial settlement in Massachusetts. American improvements in machinery and devices generally for producing footwear early revolutionized the industry and set the pace to the adoption of similar methods of production in other countries. The boot and shoe industry of no other nation, however, has reached the high level and volume attained by American manufacturers, whose preeminence in invention, methods and equipment becomes firmer established year by year. They produce footwear of a style and durability that has created a market for Am. shoes in every land. In 1921, for example, 3,957,697 pairs of shoes (children's, men's and women's) were exported of a value of \$24,678,701. The entire production of boots and shoes in that year, as reported by the U.S. Census Bureau in 1923, amounted to 284,660,000 pairs. This is not a normal output but rather a temporary decline. The industry, in common with business generally, suffered by the post-war depression, which reached its peak in 1921 and curtailed or restricted production and reduced prices to nearly pre-war levels. In 1919 831,225,000 pairs of boots and shoes were produced, and in 1914, 292,666,000 pairs. Of the 1921 output of 284,660,000 pairs, women's footwear predominated (101,140,000 pairs); then men's (69,858,000 pairs.). The manufacturing establishments in that year, including cut stock and findings, numbered 560, whose total products had a value of

BOOTS AND SHOES

\$111,809,000, as against 679 establishments with a total production of \$224,028,000 in 1919. The figure thus shows quite a setback in footwear manufacture in 1920.

In the United States a shoe is any type of footwear that does not extend above the ankle. In England 'shoe' is generally applied to footwear whose covering stops at the ankle, that is, the American 'low shoe,' or the Oxford or Derby 'tie' in English parlance. Footwear become boots in the United States when they reach above the ankle, even to the knee and beyond. In England they are boots only when they reach the shin; extended beyond that point they become top-boots or Bluchers (half boots) or Wellingtons (reaching the knee), the last named displacing the Hessian type, but are now rarely seen in England. In practice American 'shoes' and English 'boots' are synonymous.

Footwear had its origin in the sandal, which protected the soles of the feet and was not an adornment. The primitive sandal slowly acquired additions and ornamentation with the dawning and growth of culture and aesthetics and thus the modern shoe or boot acquired its present forms. The Egyptians were among the pioneer sandal-makers and the tools they used are not unlike those employed by the modern cobbler. The Romans wore the sandal, but in their empire-making they came in contact with other peoples and absorbed their diversities of dress, footwear among them, and thus came to wear shoes, boots and buskins. But it was not until the Middle Ages, with its renaissance in art and culture, that modern footwear had its beginnings. Many styles arose embracing the crude moccasin-like shoe of rawhide or roughly tanned, with its thongs as fastenings, worn by peasants; the heelless slipper-like shoe with spurs; ankle-high shoes with sharp or turned-up points; low shoes with heels and large buckles; high tight boots, heelless with pointed toes, each leggin differing in color; knee boots proclaiming their wearer as knights; the 'jack boot,' as worn by the British Horse Guards today; and the fanciful footwear styles of the French in heels and buckles.

The machinery era of the 19th century brought boots and shoes to their modern perfection as factory products. It gradually displaced the ancient craft of shoemaking, represented by the local or itinerant shoemaker or cobbler, who produced hand-made footwear of entire families, though for a long time machine and manual production went on side by side. The industry did not begin to grow to its present proportions till the invention of the sewing machine. Now-

adays, except for repairing, there is scarcely such a thing as hand-sewing in shoe manufacture. In the United States the slow operation of handwork began to be discarded with the invention of the McKay Stitching machine, which came into active use in 1861 and proved of valuable service in the supply of footwear to Union troops in the Civil War. It automatically sewed the outer sole to the inner sole by a strong chain stitch. Other machines came into operation about this time and later, among them the leather-rolling machine, which pressed the leather to the right consistency, a laborious task previously done on the lapstone; leather sewing machines for stitching the uppers with wat thread and attaching them to the sole; splitting devices for dividing leather or giving it a uniform thickness; machines for cutting the soles and other parts of a shoe on a fixed pattern; the screw machine, which cut individual layers for heels, assembled and nailed them together, and attached them to their place on the sole; and welt sewing machines, which produce shoes with smooth interiors adaptable to feet with irregularities. In fact, every operation in the production of boots and shoes is now accomplished by machinery. In one large American plant, devices are in use that effect 170 different operations on a single pair of shoes, which pass through 210 pairs of hands in the process. A standardization in manufacture and styles has resulted generally from the immense volume of production made possible by perfected machinery applied to every detail of shoemaking.

Throughout Europe and America the modern machine-made boot and shoe has generally supplanted all other types of footwear, but in other parts of the world, racial customs sanctify the retention of ancient forms of feet-coverings. Workers in China still wear the sandal made of woven reeds, while the thick-soled, quilted slipper (familiar in pictures) marks the merchant and others of that social grade. The sandal and low shoe of their ancestors, sometimes of costly leather and richly ornamented, is religiously clung to by the people of India, Turkey and Arabia. Then there are top-boots worn in Russia and in the Balkans, the sabots or wooden shoes seen in Holland, Belgium, France and Germany, and the Esparto grass sandals and slippers used in some parts of Spain. Of sabots it may be said that they are now being manufactured in quantities for domestic use in the United States.

BOPP, FRANZ (1791-1867). Ger. philologist; prof. of Sanskrit at Berlin (1821); famous *Comparative Grammar*,

in six parts (1833-52).

BORACIC ACID, BORIC ACID (H_2BO_3), obtained from hot springs and jets of steam and gases in volcanic districts in Tuscany, Lipari Islands, and Western America, or prepared pure from borax; a weak but very generally useful antiseptic.

BORACITE ($2Mg_3B_2O_7 \cdot MgCl_2$), mineral salt of magnesium, boride, and magnesium chloride; occurring in isometric tetrahedral crystals, transparent, vitreous, or adamantine, colorless, white, or yellowish green; having pyro-electrical properties and being doubly refractive.

BORAGINACEÆ, herbaceous plants, leaves alternate, hairy; flowers, salver wheel or funnel-shaped, blue or purplish; mucilaginous, containing alkalies, roots often yield dyes. Borage (*Borago officinalis*), favorite ingredient in claret cup; *Anchusa* (Alkanet) yields dye; *Symphitum* (Comfrey); *Myosotis* (Forget-me-not).

BORAH, WILLIAM EDGAR (1865), son William N. and Eliza Borah. Educated at Southern Illinois Academy and University of Kansas. Admitted to bar in 1889, practicing at Lyons, Kans., until 1891 and since then at Boise, Idaho. Elected to the United States Senate in 1903 and re-elected for each succeeding term of six years since. His present term expires in 1925. He belongs to the Progressive wing of the Republican party and is a prominent and powerful figure in all legislation. He was a pronounced supporter of measures for the effective prosecution of the World War and a vigorous opponent to the ratification of the Versailles Treaty of Peace.

BORAS (57° 44' N.; 12° 57' E.), town, Sweden. Pop. 25,000.

BORAX ($N_2B_2O_7$); white crystalline substance, dirty yellow in native state, occurring in *tincal*; biclorate of sodium; antiseptic properties; used in soldering, glazing pottery, glass manufacture, and as a preservative.

BORCHGREVINK, CARSTEN EGE-BERG (1864), Arctic explorer, native of Christiania; commanded Southern Cross expedition (1898); wrote *First on the Antarctic Continent*, etc.

BORDA, JEAN CHARLES DE (1733-99), Fr. scientist and marine specialist; forwarded scientific navigation.

BORDEAUX, town, Gironde, France (44° 50' N., 0° 35' W.); in midst of great wine, fruit, grain, and timber-producing country; trading center; third seaport in France; exports wine, brandy, hides,

wool, fish, fruits, sugar, coffee, oil, resins, cottons, machinery, etc. Archibishopal see; cathedral, fine churches; town hall, museums, theatre, library, hospital; courts of appeal and commerce; univ., various educational institutions; taken by Romans, afterwards held by Goths; passed to France and then to England with Eleanor of Aquitaine; French since 1453. During World War, when the Germans were threatening Paris in 1914, Bordeaux became seat of Fr. Government for some time. Pop. 261,700.

BORDEN, GAIL (1801-74) American inventor; born Norwich, N.Y. In 1822 he removed to Mississippi, where he taught school and held minor political offices. In 1829 he went to Texas, was elected delegate to the convention that sought to obtain freedom from Mexican rule and was active in the struggle that followed. After the republic of Texas was established, he was appointed by President Houston collector of the port of Galveston. The need of suitable supplies for emigrants crossing the plains led him to turn his attention to the making of concentrated food, with the result that he produced the 'meat biscuit,' which won for him a medal at the London World's Fair of 1851. Later he came North and secured in 1856 a patent for condensed milk. This was the basis of the great fortune he amassed, which was later augmented by other processes patented by him for the condensing of beef, fruits, tea, coffee and cocoa.

BORDEN, RT. HON. SIR ROBERT LAIRD (1854), Canadian statesman, born at Grand Pré, Nova Scotia; admitted to Canadian bar (1878); elected member of the House of Commons for Halifax, Nova Scotia (1896); became leader of Conservative opposition on resignation of Sir Charles Tupper (1901); was defeated for Halifax (1904), but returned for Carleton, Ontario (1905), and Halifax (1908, 1911, 1917). He became premier (Oct. 1911) when Laurier government was defeated on the reciprocity question; brought forward bill (1913)—which was rejected by the senate—for Canadian contribution of three battleships to the British navy; at outbreak of the Great War he zealously supported imperial government, and was the first overseas minister to be summoned to a meeting of the British cabinet. In Oct. 1917 he formed a coalition cabinet, and after general election in Dec. retained his premiership, and enforced conscription law. He represented Canada at the Paris Peace Conference (1919). Illness compelled him for a time to relinquish duties of his office.

BORDENTOWN, a city of New Jersey, in Burlington co. It is on the Delaware and Raritan Canal and on the Pennsylvania Railroad, 67 miles south west of New York City. Bordentown has many interesting historical remains and is noted for being the former residence of Joseph Bonaparte, brother of Napoleon I. It is the seat of Bordentown Military Institute and other educational institutions. Its industries include steam, forge and iron works, foundry and machine shops, canning factories, etc. Pop. 1920, 4,371.

BORDERS, THE (c. 55° to 55° 45' N., 1° 30' to 3° 30' W.), district on both sides of Cheviot Hills, Scotland and England; surface generally moors and hills; long inhabited by Cymric race, who were displaced by Saxons and Norsemen; was part of Northumbrian kingdom, annexed to England, X. cent.; scene of many feuds and incessant warfare for many cent's.

BORDER STATES was a term applied in and before the Civil War to those slave states that adjoined the more southerly of the free states. They were Delaware, Maryland, Virginia, Kentucky and Missouri. They formed a wedge between the North and South, and owing to their situation in the event of war did their utmost to stay hostilities. North Carolina, Tennessee and Arkansas have been mistakenly included among them. Because the Border States would be the chief battlefield in any war, they were the inspirers and chief supporters of every political movement to stop the slavery agitation and to conciliate the sections. As slave states they had decided leanings to the South, but they were loath to be drawn into a conflict. When the Civil War came Kentucky even tried to exercise neutrality, forbidding both North and South forces to occupy State territory without the consent of the State authorities. The war, however, forced a break-up according to their affinities. In Kentucky, Maryland, Delaware and Missouri, the loyal element, with the Union government's help, prevented the states from joining the South. Virginia alone seceded, with North Carolina, Tennessee and Arkansas.

BORDONE, PARIS (1495-1570), Ital. artist of Venetian school; painted portraits and scriptural and mythological subjects; his work has much in common with that of Titian, whose style he followed very closely; examples in the Louvre, National Gallery, Venice Academy, and many other continental galleries.

BORDURE, heraldic term for border,

either blank or charged, of shield.

BORE.—(1) wall of water formed at mouths of certain tidal rivers by narrowing of the banks; 2 or 3 ft. high in Severn, Trent, Solway, Dee, 12 ft. in Brahmaputra (see *TIDES*). (2) hollow in barrel of gun, or diameter of barrel.

BOREAS (classical myth.), the north wind; s. of Astræus and Eos; generally represented as a vigorous, winged youth in the act of flying through the air.

BORELLI, GIOVANNI ALFONSO (1608–79), Ital. physician and physicist; prof. of Math's (1649), Messina and (1656) Pisa; prof. of Med. (1657), Pisa. The first to apply math's to animal physiology.

BORGERHOUT (51° 13' N., 4° 26' E.), town, Belgium; suburb of Antwerp. Pop. 50,000.

BORGHESE, Sienese family afterwards settled at Rome and distinguished as patrons of art. Camillo B., who became cardinal, 1596, and pope as Paul V., 1605, bought the B. Palace and built the B. Villa at Rome early in XVII. cent. Camillo Filippo Ludovico B. (1775–1832) *m.* Napoleon's beautiful sister Pauline, was created prince of Guastalla (1805), and sold to Napoleon the art treasures, most of which are now in the Louvre, of the B. Villa; he separated from Pauline after Napoleon's fall. His nephew, Camillo, was War Minister, 1848; Paolo was compelled to sell the remaining possessions of the family in 1892, and while Pope Leo VIII. added its muniments to the Vatican Museums, the Ital. government acquired the Palace and valuable collections of paintings.

BORGIA, CESARE (1476–1507), s. of Rodrigo Borgia, Pope Alexander VI.; cr. cardinal (1493); released from ecclesiastical vows (1498); invested by Louis XII. with counties of Valentinois and Dolois and title of duke; *m.* Charlotte d'Albret (1499); subsequently became Duke of Romagna, but his dominions and power greatly lessened on his f.'s death (1503), and election of Pope Julius II. (Julian della Rovere), enemy of Borgia's. Cesare was killed while besieging castle of Viana (March 12, 1507); was a clever, unscrupulous adventurer.

BORGIA, LUCREZIA (1480–1519), sister of Cesare; puppet of the schemes of her f. and bro.; her 3rd husband was Alphonso d'Este, Duke of Ferrara; in high repute at death as patroness of culture, but her name afterwards became synonymous, probably unjustly, with civilized cruelty and vice.

BORGIA, ST. FRANCIS, succ. his father as Duke of Gandia, 1543; joined newly founded Soc. of Jesus, becoming general, 1565; had he wished might have been cardinal; canonized, 1671.

BORGLUM, JOHN GUTZON DE LA MOTHE (1867), American sculptor and painter; born Idaho. He was educated at St. Mary's College, Kansas. His first studies in painting were pursued at the San Francisco Art Academy. In 1890 he went abroad, and for the next three years studied at the Académie Julian and l'Ecole des Beaux-Arts, Paris. From 1896 to 1901 he was a frequent exhibitor in London and Paris, his work receiving favorable attention from critics and the public. He returned to New York in 1902. Though his art is individual and original, he was strongly influenced by Rodin in sculpture and Whistler in painting. To his extremely able technique he joins a vivid imagination and an appreciation of the ideal. He has produced many notable works in sculpture, among which may be cited: *Pursued*, *The Boer* (an equestrian figure) statues of Lincoln and Henry Ward Beecher, colossal figures of the Twelve Apostles for the Cathedral of St. John the Divine, New York City, *Wonderment of Motherhood*, *Modern Atlas*, *Night*, *Babes in the Wood* and the Sheridan Monument at Washington, D.C. His paintings include *Abandoned*, *Captive Pan and Iago and Cassio*. He has received numerous medals at expositions and is an honorary member of many societies in America and abroad.

BORGOGNONE, AMBROGIO (c. 1450–1523), Ital. artist; famous for his church decorations, examples of his best work are to be seen in the Certosa, at Pavia, and the church of San Sattiro, Milan; two small examples in the London National Gallery.

BORGU (18° 15' N., 18° 30' E.); district, basin of Niger, W. Africa; western part included in Fr. Dahomey; eastern part forms province of Brit. Nigeria; chief town, Kiamia; rice, grain.

BORING, process of penetrating substances such as rocks, in mechanical and engineering operations. For b. soft wood awls are used, but for hard wood gimlets, augurs, or brace and bit are employed. Hand drills of steel and bit are used by jewelers, whilst machine drills are used for b. metals.

B. is also used in connection with prospecting for minerals; in sinking petroleum or artesian wells; in determining the depth of rock below the surface preparatory to mining, and in geological investigations. The first

practical b. machine was used at Mont Cenis tunnel, and was invented by Sommeiller. In modern tunnel (q.v.) construction a shield fitted with diamonds as cutting agents is used. The shield is made to rotate, and is at the same time pressed against the face of the rock. The diamonds are not even scratched owing to their extreme hardness.

BORIS III. (1894), Tsar of Bulgaria; succeeded to throne on abdication of his father, Ferdinand, in Oct. 1918.

BORIS, FEDOROVICH GODUNOV (c. 1551-1605), Russ. Tsar; served at Russ. court; his sister, Irene, m. Theodore, s. and successor of Ivan the Terrible. Boris became omnipotent as guardian of Theodore, and succ. him as Tsar of Russia (Feb. 1598); a pacific, prudent ruler.

BORNEO, large isl., Eastern Archipelago, between Australia and Fr. Indo-China, immediately N. of Java (7° N.-4° S., 109°-119° 15' E.); extreme length, over 800 m.; breadth, over 600 m.; bounded E. by Mindoro and Celebes Seas, Macassar Strait; S. by Java Sea; W. and N.W. by China Sea. Labuan, an isl. off N.W. coast of Borneo, was incorporated with Singapore (1907). About two-thirds of isl. in S. E. and S. are claimed by Dutch, while N. and N.W. (states of N. Borneo, Brunel, and Sarawak) belonging to Britain. Mountain ridge runs from N.E. to S.W., height ranging from 8,000 ft. in N.E. to 3,500 in S.W.; in extreme N., Kinabalu range reaches height of 13,700 ft.; interior mountainous, with rich river valleys and marshy plains; principal rivers, Barito, Kapuas; coast is low and swampy. Best bays are in Brunel and Brit. N. Borneo. Mean ann. temp. c. 80° F.; rainfall is heavy, averaging 120 in. per annum.

Forests produce ironwood, teak, sandalwood, ebony, india rubber, damar, camphor, pepper, cloves, nutmegs, cinnamon, ginger, betel nuts, sago, coco-nuts, gambier, bamboo, canes, etc. Rice, sugarcane, sago, tapioca, coffee, earth-nuts, indigo, maize, hemp, cotton, tobacco, are cultivated; in Brit. part chief products are pepper, gambier, sago, rice. Minerals include coal, iron, petroleum, gold, antimony, quicksilver, platinum, diamonds. Edible birds' nests, trepang, pearls, and tortoise-shell are obtained. Exports are pepper, spices, gold dust, diamonds, drugs, timber, canes, gutta-percha, indiarubber, and many of above productions; imports general goods, clothing, machinery, hardware, opium, rice. Chief town of Sarawak, Kuching; of Brunel, Brunel; of Brit. N. Borneo, Sandakan; of Dutch

Borneo, Bandjermasin. Excepting Australia and Papua, Borneo is the largest isl. in the world. Area, c 289,000 sq. m.; pop. c. 2,000,000, including Dyaks, Malays, Arabs, etc.

History.—Borneo was discovered by Portuguese early in 16th cent.; during 17th cent. unsuccessful attempts were made by Spaniards, Portuguese, Dutch, and English to establish trading stations. First permanent settlement was that made by Dutch at Bandjermasin in 1733; Dutch proceeded to make further settlements, and have mastered most of island. In 1838-41 the Malay pirates were suppressed by Rajah Brooke, who founded independent state of Sarawak, which became Brit. protectorate in 1888. In this year Brunel also came under Brit. rule. See MAP EAST INDIA ISLANDS.

British North Borneo is under administration of Brit. N. Borneo Co., which obtained royal charter in 1881; governor, appointed subject to approval of secretary of state, administers affairs in Borneo, and there is court of directors in London. Its area is about 31,106 sq. miles; pop. 208,200.

Dutch Borneo comprises two administrative dists.; of these W. Borneo occupies about 55,825 sq. m.; pop. 573,600; while E. and S. Borneo have area of 156,912 sq. m.; pop. 940,800.

BORNHOLM (55° 6' N., 15° E.), Dan. island, Baltic; lighthouses; exports freestone; capital, Rønne. Pop. 41,000.

BORNIER, HENRI, VISCOMTE DE (1825-1901), Fr. poet; author of two poetic plays produced at the Comédie Française—*La Mariage de Luther* and *La Fille de Roland*—the latter of which achieved a popular success; *Poésies complètes* (1894).

BORNU (c. 12° 20' N., 12° 20' E.), state, Central Africa, W. and S. of Lake Chad; area estimated at 57,000 sq. miles; surface flat, with branches of Komaduga R. flowing to Lake Chad; climate very hot and unhealthy; produces indigo, maize, millet, cotton, ground-nuts; imports calico, sugar, salt; administered by Brit. resident with several assistants; native chief still recognized; people are negroes and half-breeds. See MAP AFRICA.

B. was independent state in Middle Ages; considerable prosperity in XV. cent.; struggle began in early XIX cent., against the Fula, who were ultimately defeated and expelled by fakir Muhammad el Anim; subject to Brit. control since 1902. Chief towns, Kuka and Maidugari. Pop. c 4,000,000.

BORO-BUDUR, remains of ancient Buddhist temple, Java.

BORODIN, ALEXANDER PORFYRIEVICH (1834-87), Russian composer; ed. for the medical profession, which he abandoned for music; became a brilliant executant on several instruments. His compositions were distinctly Russian in character and consist of symphonies, string quartets, songs, and an opera, *Prince Igor*.

BORODINO (55° 45' N., 35° 33' E.), village, Russia, on Kolotscha; here Napoleon defeated Russians under Kutusov, Sept. 7, 1812, making them cede Moscow; heavy losses both sides.

BORON. B. A non-metallic element, having the atomic weight 11.0. It occurs in nature as boric acid and in several minerals, including borax, boracite, hydroboracite, rhodizite, etc. It never occurs free. It was first isolated by Gay-Lussac and Thenard in 1808, by heating boric acid with potassium. It is now commonly prepared by heating boric acid with magnesium and treating the residue with dilute hydrochloric acid. In the pure state it is a chestnut brown soft powder, having a density of 2.45. It has no taste or odor, and is characterized by its property of staining the fingers. On heating in the air it burns with a reddish flame, forming the oxide, B_2O_3 , and the nitrate BNO_3 . It is insoluble in water, but is dissolved by strong nitric acid in the cold, and by sulphuric acid with the aid of heat, in each case, the oxide B_2O_3 , being formed. *Crystalline Boron* may be produced by heating a mixture of boric acid, aluminum and charcoal at 1500° C. for five hours, dissolving out the aluminum with soda, and boiling the residue with hydrochloric and hydrofluoric acids. The crystals are never pure, but always contain some carbon, or aluminum or both. The hardest variety of boron crystals known contain about 2.4 per cent. carbon. They have a metallic appearance and are black or very dark red in color. So-called 'boron diamonds' are colorless transparent crystals, with a chemical constitution represented by the formula $B_{12}C_2Al_2$. Boron is used commercially chiefly in the form of its compounds, boric acid and borax, but it finds some application in metallurgy. Boron steel has properties, similar to those of high grade hard carbon steel. It imparts to the steel a high tensile strength.

BOROROS, THE, people of S.W. Brazil, probably akin to Patagonians; average stature over 6 ft. 4 in.

BOROUGH (A.S. *burh*, a fortified stronghold or camp), the name of a town possessing certain governmental rights. In many places an Anglo-Saxon 'burh'

grew up on or near the site of a Roman colony, but the case is not proven for the former developing out of the latter. The 'burh' was the stronghold of a king or a tribe, with a 'wall' or 'hedge' around it. It often became a political, military, and commercial center. In the X. cent. the b. court or 'moot' first appears, with a definite area of jurisdiction, but the feudal castle of the Norman conquerors sometimes overshadowed it. 'Royal boroughs' were created by the king; the burgesses paid certain annual rents to him. Various privileges were granted by successive kings to London. The name is used for township in Pennsylvania.

BOROUGH, STEVEN (1525-84), Eng. navigator; b. Northan, Devon; accompanied Sir Hugh Willoughby (1553) in his search for a northern passage to Cathay; discovered Kara Strait (1556). His bro. William Borough (1536-99), commanded the *Lion* in Drake's Cadiz expedition (1587); wrote *A Discourse of the Variations of the Compass* (1581).

BORROMEAN ISLANDS (45° 54' N., 8° 35' E.), four islands, Lake Maggiore, Italy.

BORRROMEO, CARLO (1538-84), saint and cardinal; studied at Pavia; cr. cardinal and abp. of Milan by his uncle, Pope Pius IV., 1560; took part at Council of Trent; did much for moral reform of Church and foundation of educational establishments; canonized. 1610.

BORRON, ROBERT DE, and ELIE DE B. (fl. XII. cent.), Fr. trouvères who gave final form to the Arthurian story.

BORROW, GEORGE HENRY (1803-81), Eng. author and philologist; b. Norfolk; s. of a soldier; apprenticed to a solicitor; in 1824 went to London and found work as a publisher's hack. In 1833 he entered the employment of the Bible Society, and was sent to St. Petersburg, and afterwards to Spain. In the latter country he associated with the Zincali, in whose language he found a close affinity with that of the Norfolk gypsies he had known in his youth. He returned to England in 1839, and in 1841 pub. *The Zincala*, an exhaustive work on the gypsy languages. It was followed by *The Bible in Spain* (1843); *Lavengro* (1851); *The Romany Rye* (1857); *Wild Wales* (1862), and his most important philological work, *Romano Lavo Lú* (1874).

BORYSTHENES (46° 32' N., 32° E.), old Gk. colony at mouth of B., now called the Dneiper, S.W. Russia; founded

by Milesians (VI. cent. B.C.).

BORZOI, Russ. wolfhound; has long powerful jaws, narrow but deep chest, white coat; height, 26-33 in.

BOSBOOM-TOUSSAINT, ANNA LOUISA (1812-86), Dutch novelist; famous as writer of hist. stories, including *The Earl of Devonshire*, *Leicester in the Netherlands*, *The House of Laurenesse*, and *Gideon Florensz*.

BOSCAWEN, EDWARD (1711-61), Eng. admiral; s. of Viscount Falmouth; performed brilliant service at siege of Cartagena (1741); at Cape Finisterre (1747); besieged Pondicherry (1748); took Louisburg (1758); crushed Fr. naval power in Lagos Bay (1759).

BOSCH, JAN VAN DEN, COUNT (1780-1844), Dutch statesman; gov. of East Indies, 1828-33; Sec. for Colonies, 1833-39.

BOSCOBEL (52° 42' N., 2° 22' W.), parish, Shropshire, England; contains house where Charles II. hid after Worcester (1651).

BOSHOF (28° 50' S., 25° 18' E.), town, Orange Free State, S. Africa; British defeated Boers, 1900.

BOSHER, KATE LANGLEY (1865), author; born Norfolk, Va. She graduated from the Norfolk College for Young Ladies, 1882. She became widely popular as a writer because of the whimsical humor and clever characterization that distinguish her work. Her publications include *Mary Cary* (1910); *Miss Gibbie Gault* (1911); *The Man in Lonely Land* (1912); *The House of Happiness* (1915), and *Miss McFarlane* (1913).

BOSNA SERAI, SARAJEVO (43° 54' N., 18° 30' E.), fortified town, capital of Bosnia. Pop. 55,000.

BOSNIA - HERZEGOVINA, dists., Jugo-Slavia (44° N., 18° E.); Dinaric Alps run from N.W. to S.E., surface sloping thence N.E. to Save basin, S.W. to Adriatic. Herzegovina, in S., is bare and rocky; Bosnia, to N., has mt., forests and fertile valleys; chief rivers, Save and its affluents; large part of surface wooded—lime, beech, pine, larch. Great majority of population are engaged in agriculture; chief crops—tobacco, grain, fruits, beet, flax, hemp; cattle, sheep, swine, horses, mules, are largely raised; silk culture is being introduced, and wine is made; anthracite and iron ore mined. Exports include timber, fruit, coal, iron, chemicals, live stock; imports include oils, coffee, beer, wine, spirits, wool, cottons, silk, grain, flour, rice, paper, leather, glass, china, hardware, machinery, soap. Cap. of Bosnia,

Sarajevo; of Herzegovina, Mostar. There are ry. communications with Brod on Danube and Gravosa on Adriatic; mileage over 1,200.

Inhabitants are Croato-Serbians; Span. Jews, gypsies, and colonists of other nationalities also represented. Principal religions are Oriental Orthodox, Mohammedan, R.C., and there are some Jews, Evangelicals, and other Christians. Education is free, and, under certain circumstances, compulsory. Area, 19,760 sq. m. Pop. 1,900,000.

History.—The Slav settled in Bosnia in 6th and 7th cents., and for a time maintained their independence; subject to Hungary, 11th-13th cent.; to Serbia in 14th cent., attaining independence under Twartko in 1370. After latter's death the kingdom began to decline and became involved in war with Turks, who ultimately subdued Bosnia in 1463, Herzegovina in 1483. Under Turkish rule natives were cruelly oppressed; Christians constantly persecuted; murder was considered no crime, robbery and brigandage were recognized professions. Revolts occurred in 1849 and 1875. In 1878, by Treaty of Berlin, provinces were handed over to Austria-Hungary for administration and military occupation; in 1908 they were definitely annexed to that empire; discontent culminated in murder of Archduke Francis Ferdinand (June 28, 1914), Austria's ultimatum to Serbia, and the World War. In 1918, on dissolution of dual monarchy, the provinces joined Jugo-Slav state. See MAP CZECHOSLOVAKIA.

BOSPORUS, BOSPHORUS (41° 10' N., 29° 5' E.), strait between Black Sea and Sea of Marmora. See TURKEY, DARDANELLES; WORLD WAR.

BOSPORUS CIMMERIUS (45° 15' N., 36° 30' E.), old name for strait between Azov and Black Seas; length, c. 23 miles; width, 2 to 22 miles; district traditionally inhabited by Cimmerii; formed independent kingdom, V. cent. B.C.; conquered by Mithridates of Pontus, 115 B.C.; belonged in turn to Sarmatians, Chersonesians, Tartars; modern Kerch or Yenikale.

BOSS, the raised outside center of a shield, or buckler; a protuberant ornament; in arch., a projecting ornament; colloquial (of Amer. origin), an employer, a master-workman.

BOSSI, GIUSEPPE (1777-1816), Ital. artist and writer; his own brushwork was not remarkable, but his critical writings are valuable, and include *Del Cenacolo di Leonardo da Vinci*, *Delle opinioni di Leonardo*, etc.; he was sec. of the Milan Academy, and an

intimate friend of Canova.

BOSS RULE, Amer. term for a corrupt system of national and munic. politics, formerly very prevalent, in which party leader or boss organizes and manipulates elections by every kind of dubious means, and rewards his subordinates.

BOSSUET, JACQUES BÉNIGNE (1627-1704), Fr. theologian and orator, ordained 1652; came to Paris, 1659, and became famous as a preacher, especially for his *Oraisons funebres* (funeral sermons); tutor to the dauphin, s. of Louis XIV., 1670. B. was a man of keen intellect, but entirely opposed to disorder and anarchy, and therefore a firm believer in absolutism in Church and State, which he defended in his *Discours sur l'histoire universelle*. He applauded, therefore, the Revocation of the Edict of Nantes. But he defended the liberties of the Fr. Church against the Papacy in the *Defensio Cleri Gallicani*. He became involved in a bitter controversy with Fénelon. B. is one of the greatest figures of the monarchy of Louis XIV.

BOSTON, cap., Massachusetts, seventh city and fifth seapt. of U.S. (42° 22' N., 71° 5' W.), on Boston Harbor, at mouth of Charles and Mystic rivers. Boston is a great railway center; number of lines of steamers ply regularly to foreign ports; has excellent harbor accommodation and a good system of street railways and subways. Imports include wool and woolsens, chemicals, iron and steel manufactures, wood, leather, fruit, fish, paper stock; exports provisions, live cattle, bread-stuffs, cottons, leather goods, wood, iron and steel manufactures, spirits.

Older part of town noted for narrow, irregular streets; newer part regularly laid out; main thoroughfare, Washington Street. Most famous buildings are public library, second largest in America, old State House, and Faneuil Hall, where resistance against Britain was first declaimed by revolutionary orators. In northern suburb of Charlestown is Bunker Hill Monument, commemorating famous battle in War of Independence. There are beautiful parks, including Franklin Park, and many churches, including R.C. cathedral. Educational institutes include Boston Univ., R.C. Coll., medical school of Harvard Univ., fine art school, and music conservatory; and there are many schools, including over 300 primary schools. Boston was for long the center of culture in America, and many great literary men, such as Longfellow, Lowell, Emerson, Whittier, have been associated with it; birthplace of Benjamin Franklin and Poe.

History.—Boston has developed from a settlement made in 1630 by members of the Massachusetts Bay Company, led by John Winthrop. Most of early settlers were Puritans and came from Lincolnshire. First called Trimountaine, name was afterwards changed to Boston. It was chosen as capital in 1632, and soon became principal seaport in America. In 1765 the Stamp Act was bitterly opposed here, and the 'Boston tea party' (1773), when 350 chests of tea were thrown into the harbor, was a prelude of the American Revolution. Boston played an important part in the Revolution and abolition of slavery. Pop. 1920, 748,060; with metropolitan area, 1,700,000.

BOSTON (53° 4' N., 0° 1' W.), seaport, Lincolnshire, England; fine parish church with decorated chapel; tower called Boston Stump; important fisheries; exports coal. Pop. 1921, 16,100.

BOSTON, Fr. card game, popular in America during the latter part of the XVIII. cent. It is said to have been first played at Boston, Mass., and had certain similarities to both whist and quadrille.

BOSTON MASSACRE, the name given to a clash between a mob and British soldiers in Boston, on March 5, 1770. Some time before this date the British Commissioners of Customs had ordered the seizure of the colonial trading sloop 'Liberty,' whose skipper had been found guilty of smuggling. So enraged were the citizens that the commissioners were at the time obliged to seek refuge aboard a British warship in Boston harbor. Ill temper continued among the people, which finally resulted in a free fight between some workmen and British soldiers, on March 3. In the evening of March 5 some boys began taunting the sentry in front of the Customs House, who struck one of the boys with the butt of his musket. The boy promptly fled but presently returned, followed by a mob, at the head of which was a half-breed mulatto, Crispus Attucks. A corporal's guard came to the relief of the sentry, but the mob became more and more violent. Col. Thos. Preston, a British officer, tried to calm the mob, without effect. Finally, in desperation, and apparently on their own responsibility, the soldiers fired into the mob, killing Attucks and two others, and mortally wounding two more. To pacify the people, the Governor ordered Col. Preston and the soldiers to trial, the colonel being defended by John Adams and Josiah Quincy. He and six of the soldiers were acquitted, but two were found

enemy in the Fr. press; that he had endeavored to buy shares in the *Figaro* with this end in view; and that he had acted as intermediary between the Ger. government and the ex-Khedive in an endeavor to promote a pacifist movement. Bolo was found guilty, and shot as a traitor at Vincennes (April 17, 1918). His career is one of the most remarkable blends of rascality and charlatanism.

BOLOGNA. (1) Prov., Italy; wheat and maize largely grown. Area, 1,448 sq. m.; pop. 578,000. (2) Cap. of above (44° 29' N., 11° 21' E.); cathedral of San Pietro (rebuilt 1605); interesting old churches; two leaning towers, Torre Asinelli and Torre Garisenda (12th cent.) univ. (11th cent.).

BOLOGNA STONE, a variety of heavy spar or sulphate of barytes.

BOLOGNA, GIOVANNI DA (1524-1608). Fr. sculptor; lived chiefly in Italy; and assumed this Ital. name; was employed by Francesco and Cosimo de' Medici; fine examples of his work (e.g. *The Rape of the Sabinas*) in Florence.

BOLSHEVISM, pertaining to the Russian Communist Party. The name took its origin from the split which took place in the Russian Social-Democratic Party, which occurred in 1903, the larger faction being known as the 'bolsho,' meaning the majority, the minority being the 'menshe,' their partisans thenceforward being known as 'bolshhevikd' and 'menshevikd.' The split was over principles which had brought about splits in the socialist parties in all other countries where the Socialist Idea had a following. The original Marxian theory, based on so-called 'scientific' reasoning, was that through inevitable development the capitalists were daily growing richer, acquiring more and more of the wealth of the nations, while at an equal rate, the workers were daily becoming more impoverished. This process might be hastened or delayed by contributing causes, but the final crisis must be inevitable. Then, in sheer desperation, the workers would revolt, overthrow the capitalist system and assume control through the 'dictatorship of the proletariat,' which would continue until the proletariat, or working class, had absorbed all other elements of society, after which would come true socialism, based on a real democracy. This natural process of evolution, as it was supposed to be, could be hastened only by one form of effort; the workers must organize on the idea of 'class consciousness;' first of all they must strive to bring a realization of the fundamental

facts to all other workers; that the working class organization might be strengthened and developed; this organization must then prepare itself for the future responsibility which it must assume when the crisis came, the taking over the reins of government. There must, however, be no activities in politics, since the formation of political parties lead to relations with the capitalist state, and inevitably to compromise. Armed revolution was not a chief feature of this program, but it was recognized that when the disorders attending the crisis, the social revolution, came, it might be necessary to employ armed force to bring about the new social order. This was the main aspect of the Marxian doctrine, which the first disciples of Karl Marx accepted. As time passed, however, its impracticability grew more and more obvious to the less fanatical Socialists. For one thing, labor organization tended to check the tendency indicated, by improving the economic conditions of the workers. Liberal legislation also mitigated some of the abuses of the capitalist system. Middle class social reformers also brought about improvements which acted as a check. Gradually Socialists began to realize that if they did not associate themselves with these ameliorating causes, they would gain no popular support and remain limited to a few doctrinaire groups, too small in numbers to carry influence. Thus, first in Germany, political socialist parties were formed, demanding remedial legislation. These liberal socialists grew in number, and formed what is generally called the 'right wing.' In most European countries they were in a large majority before the Great War broke out, and most of them supported their governments in prosecuting the struggle. In Russia, however, the socialists had not come up against any practical experience, since there were no reforms. There was, in the first place, only a very small capitalist class. Absence of suffrage denied them experience in politics. For this reason the doctrinaire socialists were there in a majority. These were the 'bolshhevikd,' after the split, which occurred in Russia at a much later date than in other countries. At their head was Vladimir Illitch Ulyanov or, as he is better known, Nikolai Lenine. After the outbreak of hostilities his party was much depleted by desertions, for many found it impossible to resist the call of their country when it came to a war against their hereditary enemies, the Germans. Those that remained were mostly in Switzerland or other neutral countries. Throughout the war they remained consistently opposed to taking part, since it was their

theory that the war was nothing but a clash between the big capitalist interests in the various countries. But they continued active in spreading their propaganda where they could, proclaiming that the workers should not fight each other, but should join together and, as an international body, overwhelm capitalism. This propaganda passed unheeded during the first few years of the war, while yet national enthusiasm ran high. But eventually the tremendous strain on human morale began to manifest itself, in Russia first of all. Suddenly came the crash of the Russian autocracy, brought about, first by its own weakness, secondly by the stupidity of the man at the helm, Premier Stolypin. It was the patriotic Socialists, however, under Alexander Kerensky, who were able to take immediate advantage of the situation, they being on the ground. Thus they established a Socialist Republic, adapted to conditions. They realized the necessity of continuing the fighting with the Allies, until the Germans were decisively beaten, since German Imperialism was, after all, a greater danger than capitalism. This reasoning, however, was not apparent to the ignorant peasants forming the rank and file of the Russian Army. They welcomed the new government, truly, since they detested the autocracy. But they were sick of fighting. Kerensky exhorted them to continue fighting. For a while they responded. And then the Bolshevik propaganda began to circulate among them, meeting their deepest desire—an end to fighting. It was the grand opportunity of the Bolsheviks, and they made the most of it. Tons of literature were smuggled into the Russian lines. No doubt German money financed much of this, but if such leaders as Lenin were aware of it, it was most assuredly in no attitude of friendliness toward Germany. It was the reaction of the Russian soldier against warfare and the life in the trenches which brought about the downfall of the Kerensky Government. The Bolsheviks stepped into the breach, as it were, through no effort on their part. Thus, on November 7, 1917, they came into control of the ruins of the great Russian Empire; consisting of a handful of Marxian theorists, supported by the masses because they declared there would be no more fighting. The history of Bolshevism since that date is nothing but one continuous record of adaptation, the Bolshevik leaders, or Communists, as the original followers of Marx called themselves, having remained in power only through their long series of compromises between actual fact and their

doctrines. That these dreamers, disciples of a theory evolved out of the head of a bookish scholar, should have been able to remain in power six years, long enough in which to acquire practical experience, is perhaps one of the most remarkable things in history. Conditions, however, were in their favor. The country was big and isolated, too big to be easily invaded; there was anyway a lack of experienced administrators among Russians; and, as determining a feature as any, it chanced that at least two of the Bolshevik leaders, Lenin and Trotsky, happened to be men of most remarkable latent ability. Whatever his views as a theorist, history will recognize Lenin's as one of the greatest administrative minds of modern times, while the dynamic energy and executive capacity of Leon Trotsky, reorganizer of the Russian Red Army has, probably, not been equalled during his own period of activity. From November, 1917, until the beginning of 1920, may be said to be the first phase of Bolshevism in power. During this period, and especially during the first year and a half, Bolshevism was pure Marxian doctrines, attempting to adapt facts to itself. The leaders were firmly convinced that the hour of social revolution had come, according to the Marxian schedule, and that they had merely fulfilled their program by assuming power at the critical moment. That the cataclysm had been brought about by military reverses, and not by industrial disorganization, meant nothing to them. The masses had revolted. For them there was nothing to do but to step forward and proclaim the "dictatorship of the proletariat," which they formally did when they disbanded the Constituent Assembly on January 19, 1918. Members to the Constituent Assembly had been elected by landowners, merchants, bankers, etc., whereas Marxian theory demanded that only property-less workers should be represented. In dissolving the Assembly the Bolsheviks were only acting, as every intelligent Socialist realized, according to their own principles. They could not consistently have done otherwise. But Marx had warned that the social revolution must be international to be effective. For a brief period it certainly looked as though this might be the case, to a large extent, at least; in Hungary and Germany it appeared that the proletariat might assert itself. Again according to their own principles, the Bolsheviks did everything in their power to further this tendency. Russian gold was lavishly spent on furthering revolution in other countries. But those revolutions failed. In other countries

there were no such powerful leaders as Lenine and Trotzsky, the capitalist class was there a real, experienced element, and the workers had faith in its ability. Following the failure of the revolutionary movements abroad, came the danger that Marx had in mind. Russia was invaded by armies representing the reactionary elements of Russia itself, and of the other countries, especially reactionary France. From this danger Bolshevism was saved, not by its own 'class conscious proletariat,' but by the patriotism of the peasant class. The peasants saw in the enemy not capitalist legions, but foreign invaders, and made short shrift of them as such. Bolshevism was saved in two ways: from a military overthrow; secondly, from internal disruption. For now the Russian peasantry, which cared not a straw about Marxian theory, had faith in the Bolsheviks as defenders of national integrity. But now Bolshevism was experiencing its first disillusion. Social revolution was not going to be international. That fact became every day more obvious. To this fact they gradually adapted themselves. From open enmity toward all the 'capitalist' countries, they now turned to a policy of friendly relations. Recognition was sought. Envoys were sent abroad to open up relations. The second disillusion was at home. The peasants, 80 per cent of the population, refused to act as a proletariat should act. They wanted land, property; they wanted it as personal property. Marx had, in fact, warned that the peasant class would always be an obstacle to the social revolution. And here came another big concession, a compromise with principle. Land nationalization had to go by the board. It was parceled out among the peasants. Meanwhile industry had been nationalized. The comparatively few industrial plants in Russia were taken over. But it happened that distribution, a function carried on in other countries by jobbers, wholesalers and retailers and other middlemen, was in Russia largely in the hands of the consumers' co-operatives. These democratic institutions, the membership of which was largely workers, had been left alone up till the beginning of 1920. Then they were nationalized by decree. How tremendous a mistake that was may be judged from the fact that the decree was revoked in March, 1921. Lenine, in fact, had been opposed to it in the beginning. It was one of the most important compromises yet made, for thereby Bolshevism renounced its control over that phase of industry—distribution. From now on the disintegration of the old ideas was

rapid. The nationalized industries were daily deteriorating, the output dwindling. Concessions were put up to action to foreign capitalist syndicates. Foreign capital was eagerly sought to develop natural resources. The changed policy was summed up in a speech made by Lenine in October, 1922, in which he said that 'his hearers could not but remark the sudden change in the economic policy of the Soviet, etc.' The year 1923 found Bolshevism in Russia differing very little from any other party in power in any other country. The ideals of Marxian Socialism, or Communism, are still held up before the rising generation in the schools and colleges, but in actual practice it is recognized that they are only ideals, attainable only after years of much self-sacrifice, a sacrifice which the Russian people, and especially the Russian peasants, seem little disposed to make.

BOLTON, BOLTON - LE - MOORS (53° 35' N., 2° 26' W.), town, Lancashire, England; center of cotton industry; manufactures muslins, paper, chemicals; has iron foundries, sawmills; coal mines in neighborhood; created parliamentary borough, 1832; returns two members; grammar school, founded 1641; stormed by Royalists in Civil War. Pop. 1921, 182,200.

BOLTON, CHARLES KNOWLES (1867), son of Charles E. and Sarah Knowles Bolton. Graduated at Harvard University in 1890. Assistant Harvard Library, 1890-1893; Librarian Brookline Library, 1894-1898 and of Boston Athenæum Library since that date. Author *Love Story of Ursula Wolcott*, 1895; *Private Soldier Under Washington*, 1902; *Scotch-Irish Pioneers*, 1910; *American Library History*, 1911 and *Portraits of the Founders*, 1918. Has written extensively on library administration and on library topics in general.

BOLTON, SARAH KNOWLES (1841-1916), an American author, wife of Charles E. Bolton, merchant and philanthropist. Her writings include *Girls Who Became Famous*, 1886; *Famous American Authors*, 1887; *Famous American Statesmen*, 1888, and *Famous Types of Womanhood*, 1892.

BOLZANO, BERNHARD (1781-1848) Austrian philosopher; was ordained to the priesthood, and became prof. of Philosophy at Prague, but his opinions led to his being deprived of the exercise of both offices; author of *Lehrbuch der Religionswissenschaft*, and other philosophical works.

BOMA (5° 40' S., 13° 15' E.), capital, Belg. Congo; important seaport; ex-

ports rubber, ivory. Pop. c. 3500.

BOMARSUND (60° 15' N., 20° 11' E.), town, Finland; formerly fortified; captured by French and English, 1854.

BOMB, a hollow explosive projectile ignited by a time fuse set in action on discharge, or by a percussion fuse operating on impact. In modern war, bombs are thrown by hand, fired from a rifle, or dropped from aircraft. First used with effect by Japanese at Port Arthur (1904). Aircraft bombs were constantly employed in the World War. There are two main classes: (1) high-explosive bombs, designed to damage works or personnel; and (2) bombs whose main object is the release of lethal or lachrymatory gas or of incendiary compounds, the former of which require a strong explosive to actuate them, and the latter only a light bursting charge.

BOMBARDIER BEETLE, beetle which when attacked ejects from anus evil-smelling fluid.

BOMBARDMENT is the attack on a fortress, town, or military position, by throwing explosive bombs into it. The object may be to destroy military stores, demolish fortifications, shake the morale of troops holding a position, or, in case of a town, terrorize the inhabitants into surrender. The introduction of high-explosive shells and heavy howitzers has made this a highly effective method of attack. Aeroplanes and observation balloons have also made bombardment even more effective than hitherto, and in the World War bombardments were carried out and ammunition expended on an unparalleled scale. It is probable that no town or fort of the old type could now hold out against determined and sustained bombardment. A new form of bombardment, known as barrage or curtain fire, developed during the World War, by which a zone of ground was so shelled as to become practically impassable. This method was also used for the protection of advancing infantry.

BOMBARDON, BASS TUBA, one of the saxhorns, a deep-toned musical instrument used in orchestras and military bands; for the latter use it is made in a circular form, and worn round the body.

BOMBAY, the cap. of Bombay Presidency, and second port of India (18° 55' N., 72° 54' E.), situated in S. of Isl. of same name, lying off coast of prov. and connected with mainland by bridges and causeways. In N. is native town; in S., European garrison; natives are of many different races;

chief religions, Hinduism, Mohammedanism. Bombay has some fine buildings, including a univ., the Victoria railway terminus, Ragabai Tower, municipal offices, several colleges, and large hospitals; most important manufacturing town in India; favorably situated for foreign trade; has magnificent natural harbor, wet docks, and many dry docks; railway communication with all parts of India; center of cotton trade; other industries are dyeing, tanning, metal work; imports and exports are practically those of presidency. The motto of the city is '*Primus in Indis*.' During the plague of 1896 every house had its victims, and nearly half a million of the survivors fled the city. It is extremely congested; seventy-six per cent. of the people live in one-roomed tenements. The Improvement Trust (est. 1900) does good work in reclaiming lands from the sea, opening out crowded localities, and constructing sanitary dwellings for the poor. Pop. 979,500.

BOMBAY PRESIDENCY, governorship, Brit. India (13° 53'-28° 29' N., 66° 40'-76° 32' E.); bounded N. by Baluchistan and Punjab, E. by Rajputana, Central India Agencies, Berar, and Hyderabad, S. by Madras and Mysore, W. by Arabian sea; coast-line towards N. broken by Gulfs of Cutch and Cambay; Narbada R., flowing to latter, divides prov. into two parts, of which northern consists of Gujarat and great plain of Sind, southern of coastal strip along Arabian Sea and part of Deccan tableland; chief mountains are W. Ghats, Satpura range, and outliers of Aravalli Hills; rivers, Indus (which traverses Sind), Narbada, Tapti.

Climate varies; high temp. in Sind plains; rainfall slight in N., moderate on tableland; heavy on coastal strip; wettest months, June to October; chief crops are wheat, cotton, millet, rice; other products are pulse, oilseed, sugar-cane, indigo, tobacco; principal industries, cotton manufacture, silk-weaving, carpets, leather goods, pottery, brasswork, wood-carving, cutlery, jewelry; minerals include gold, iron, Railway mileage, principal lines, c. 10,000 m. Administration carried out by governor, who is assisted by executive council of three members and legislative council of 48 members; the population includes Europeans, Maharrattas, and other races; majority are of Hindu religion, Mohammedanism coming next in numerical importance. Area (including feudatories and the dependency of Aden), 186,923 sq. m.; pop. 27,084,000.

History.—Between late 15th and early 17th cent. settlements were made in Bombay by Portuguese, Dutch and

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English, of whom Portuguese first appeared. Bombay I. passed to England when Charles II. married Catherine of Braganza in 1661, and was subsequently granted to East India Company in 1668; other districts were added at various dates, and following successful wars against the Mahrattas, Governor Elphinstone (1819-27) organized the province; has frequently suffered from plague. See MAP CENTRAL AND S. ASIA.

BOMBELLES, MARC MARIE, MARQUIS DE (1744-1822), Fr. diplomatist; later, bp. of Amiens.

BOMBING MACHINES. A heavy type of aeroplane used for carrying and dropping bombs. They were first developed during the European War of 1914-18, and reached a high degree of efficiency. The early machines used by the Germans for dropping bombs on French and English cities were nothing more than the ordinary military aeroplanes put to particular use, but in the later years of the war both sides built machines specially designed for carrying great weight and equipped with devices for enabling the crew to drop the bombs with ease and accuracy. Among the allies, the two largest bombing machines were the Handley Page and the Caproni. The former was driven by four Rolls-Royce engines, each of 300 horse power. It carried sufficient fuel for ten hours flight and traveled at a speed of 80 miles per hour. Shortly after the armistice one of these planes flew over London carrying forty passengers. The Caproni triplane was equipped with three Fiat engines, each of 600 horse-power, and was capable of carrying three tons of bombs. It was used by the Italians in raids on Pola and Trieste. Other smaller types of bombers used by the allies were the Caudron, the Breugnot, the A. V. Roe, the Letord, and the Morane-Saulnier. Among the most famous of the German bombers were the Gotha, the Frieschaven, the Lizenz and the A. E. G. The first was of the 'pusher' type, was built of wood, and was equipped with twin 500 horse-power engines. It carried a crew of three men. The A. E. G. was the latest type of German bombing machine. Its framework was of steel tubing, its span 60 feet, and its speed 90 miles per hour. It was equipped with twin Mercedes engines of 260 horse-power. The Lizenz had a span of 140 feet, could carry nine men and 2000 lbs. of bombs. At the time of the armistice Germany possessed 200 bombers. In addition to the mechanism for releasing the bombs, the machines were equipped with Goerz sights, to enable the operator to aim. Other special equipment used on both

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sides consisted of flares, ignited, when dropped by the resistance of the air, which were used to illumine the object of attack. They were capable of producing from 300-400 candle-power. Special bombs, containing 60 per cent of their weight of explosives, were also developed, the ordinary artillery shells containing only about 5 per cent of explosive.

BONA, BÔNE (36° 55' N., 7° 42' E.), port, Algeria; quasi-Byzantine cathedral, Grand Mosque, and citadel; fine harbor; exports phosphates, sheep, barley, iron, etc.; imports manufactured articles; occupied by French, 1830, 1832. Pop. 45,000.

BONA DEA (classical myth.); Rom. goddess of fruitfulness.

BONA FIDES (Lat. 'good faith').—The b. f. of defendant is an equitable consideration which entered largely into Rom. law and modern codes founded thereon. To obtain alcoholic liquors on Sunday in Scotland; or in certain hours in Eng., persons must be *b. fide* travelers (i.e. have traveled from three miles distant that day).

BONA, GIOVANNI (1609-74), Ital. cardinal and author; wrote numerous devotional and liturgical books; his *Manuductio ad Coelum* (Guide to Heaven) was translated into English by L'Es-trange, 1680 (new ed., 1898).

BONAIRE ISLAND (12° N., 68° 50' W.), island, Dutch W. Indies. Pop. 6000.

BONANZA (Span. 'prosperity'), colloquial expression in Amer. mining districts for anything profitable.

BONAPARTES, BUONAPARTES (It. form).—The Bonaparte family consisted of: Charles Bonaparte (1746-85), *f.* of Napoleon I., descendant of Ital. family settled in Corsica; occupied position at court of Ajaccio; m. (1764) Letizia Ramolino, a good *bourgeoise* to whom Napoleon was devotedly attached; as 'Madame Mère' in the Tuileries, she obstinately made economies against the evil days which she knew would come; she followed Napoleon to Elba, and d. 1836. Napoleon I. (q.v.) was the second son (b. 1769); he had 4 bro's and 3 sisters, whom he treated with culpably magnificent generosity. He once said bitterly: '*On dirait que j'aurais mangé l'héritage de notre père*'—Joseph (1768-1844), eldest bro. of Napoleon I., d. Corte, Corsica; became councillor of Ajaccio municipality; fled to France on victory of Paolist party; app. minister to court of Parma (1797); subsequently one of members for Corsica in Council of Five Hundred; king of Naples (1806-

8); king of Spain (1808-13). In Spain he endeavored to thwart Napoleon, but was little more than nominal king, and retired from Madrid after his defeat at Vittoria (1813); he was lieutenant-general of France (1814); subsequently settled in U.S.A. as Comte de Survilliers; *d.* at Florence.—Lucien (1775-1840), Prince of Canino; Napoleon's ablest bro.; espoused democratic movement (1789); subsequently pres. of Council of Five Hundred and Minister of Interior (1799); ambassador to Madrid (1800); estranged from Napoleon (1803); lived for some years in Italy; offered Napoleon his help during the Hundred Days; *d.* at Rome. His eldest s., Charles Lucien Jules Laurent, went to America, and is famous for his *Amer. Ornithology*; his younger s., Louis Lucien (1813-91), was authority on Celtic speeches.—Louis (1778-1846), Napoleon's favorite bro., educated by Napoleon, at the cost of much privation, from his lieutenant's pay; accompanied Napoleon during Ital. campaign (1796-97); became general (1804); gov. of Paris (1805), king of Holland (1806). Napoleon declared Holland an integral part of Empire (1810); Louis fled to Bohemia. His s. afterwards became Napoleon III. *f.* of Eugene Louis Jean Joseph (*b.* 1856-79), 'Prince Imperial,' slain by Zulus.—Jerome (1784-1860), king of Westphalia (1807-13); m. Catherine of Württemberg; commanded a division of Fr. army at Waterloo; subsequently a marshal of France and pres. of Senate.—The *affaires galantes* of Napoleon's sisters were matters of European scandal. Elisa (1777-1820), m. Felix Baciocchi, a well-connected Corsican (1797); made Grand Duchess of Tuscany and Princess of Lucca and Piombino by Napoleon.—Pauline (1780-1825), Princess Borghese (1803), Napoleon's second and most beautiful sister; Duchess of Guastalla (1808-13).—Caroline (1782-1839), m. Joachim Murat, king of Naples (1803-13), and devoted herself to furthering his interests.

All the above had issue, many of whom achieved distinction. The Bonapartes of Baltimore are descended from Jerome Bonaparte by his marriage with Elizabeth Patterson (1803).

By his second w., Marie Louise, Napoleon had a s., the little king of Rome, afterwards recognized as Napoleon II. Napoleon's stepdaughter, Hortense de Beauharnais, m. his brother Louis, father of Napoleon III.

BONAPARTE, CHARLES JOSEPH (1851-1921), son of Jerome Napoleon and Susan May Williams Bonaparte. Grandson of Jerome Bonaparte, king of Westphalia, the younger brother of

Napoleon. Graduated at Harvard in 1871 and from Law School in 1874. Practised law in Baltimore, Md. President Roosevelt appointed him Attorney-General in his Cabinet in 1906.

BONAR, HORATIUS (1808-89), Scot. Presbyterian theologian, author of well-known hymns.

BONASA GROUSE (*Bonasa umbellus*), N. Amer. grouse, recognized by absence of feathers from toes and lower leg, and by black neck-ruffs.

BONAVENTURA, ST. (1221-74), Ital. Franciscan theologian; studied at Paris; general of Franciscan order, 1256; called 'The Seraphic Doctor'; canonized 1482. A mystical theologian, he opposed the Aristotelianism of Roger Bacon and St. Thomas Aquinas and showed platonizing tendencies; a profound philosopher and theologian.

BONCHAMP, CHARLES MELCHIOR ARTUS MARQUIS DE (*d.* 1793), Vendéan leader; served in Fr. army, but retired on outbreak of Revolution; became leader of Vendéan insurgents (1793), and was killed at battle of Cholet.

BOND, a written instrument, signed and sealed by a person who is called the obligor, by which he acknowledges that he owes a certain sum of money to another, or that he is bound to do some act for the benefit of that other, who is called the obligee. Money due under a b. can be recovered within twenty years after it has become due, whereas in the case of simple contract debts, the right to recover is barred at the end of six years from the last acknowledgment in writing of the debt, or the last payment of any portion of the principal or interest.

BOND, SIR EDWARD AUGUSTUS (1815-98), Eng. librarian; entered Brit. Museum (1838); app. chief librarian (1878); one of the founders of the Palaeographical Soc.; edit. a series of Anglo-Saxon charters.

BOND, SIR ROBERT (1857), Prem. Newfoundland, 1900-9; prominent in Fisheries disputes.

BOND, WILLIAM CRANCH (1789-1859), Amer. astronomer; introduced astronomical photography, discovered 8th satellite of Saturn (1848), invented astronomical chronograph.

BONDE, GUSTAF, COUNT (1620-67), Swed. statesman; became Lord High Treasurer (1659), and member of council of regency during minority of Charles

XI.; favored pacific and economic policy in national affairs but overborne by colleagues.

BONDED WAREHOUSE, a government store or custom-house store where imported goods are lodged, pending re-exportation or until the duties chargeable thereon are paid on removal. The system of bonded warehouses (proposed in Walpole's Excise Scheme, 1733) was not adopted till 1803.

BONDI, CLEMENTE (1742-1821), Ital. poet, priest, prof.; chief work, the poem, *La giornata villereccia*, resembles Lamartine's style.

BONDU (14° N., 13° W.); native kingdom, Fr. Senegal, W. Africa; well cultivated; people chiefly Fula; cotton, tobacco. Pop. c. 30,000.

BONE is the hard substance of which the skeletons of animals is built up, serving as a framework for the body and for the protection of vital parts, and is a connective tissue in which earthy salts have been deposited in order to strengthen the structure. B's are classed as *long* (e.g.), in thigh, *flat*, (e.g.), in skull, and *cutical or irregular* (e.g.), in wrist. The animal or organic matter amounts in b. to about one-third of the whole, and the earthy or organic matter, in the form of salts, to about two-thirds. According as it is dense and hard in structure, or light and spongy, b. is called *compact* or *cancellous*. On microscopic examination b. is found to be formed by innumerable little canals, running longitudinally in a long b., each containing blood vessels, and their walls formed by a series of rings of bony substance. Filling the spaces in b. is marrow, composed of fat cells, and of the same corpuscular elements as are found in the blood (q.v.), but in a less advanced stage of development; there are two kinds of marrow, yellow and red, the former being found in the interior of long bones (e.g.), the thigh bone, and the latter in smaller long bones (e.g.), the ribs, and in short bones (e.g.), vertebrae. Yellow marrow has a much greater number of fat cells, hence its color, while red marrow is almost entirely composed of the other cellular elements, from which the blood corpuscles are formed. B. is formed from cartilage or from membrane, usually the former, little points of bony cells developing and the area then spreading.

Inflammation may affect the covering of the b. or *periosteum*, the b. itself, or the substance in the canal within, or *medulla*. It may be acute or chronic, the acute form usually being due to injury followed by bacterial infection, and the chronic to the continued suppuration

of acute form, to syphilis, and to tuberculosis. The former is usually treated by rest and fomentations, operation being sometimes necessary, and the latter by general treatment of the disease affecting the individual.

Fractures are treated by rest in splints, and massage, begun early.

Rickets is a general disease of children, with special manifestations in the bones.

BONE ASH, formed from calcined bones; used for fertilizing and in manufacture of cupels.

BONE MANURES consist mainly of phosphate of lime and ammonia.

BONE, HENRY (1755-1834), Eng. enamel-painter; private and hist. portraits and classical subjects.

BONER, ULRICH (XIV. cent.), Swiss fabulist; author of a collection of fables, *Der Edelstein*, written in Middle High German; edit. by G. F. Benecke (1816).

BONESET, an annual plant, native to the United States. It has a tall stem, four to five feet in height, which is surmounted by a small flat head of light purple flowers. It was formerly much used as a domestic medicine in the form of an infusion, and was supposed to have tonic qualities.

BO'NESS, BORROWSTOUNNESS (56° 1' N., 3° 36' W.), seaport, Firth of Forth, Scotland; extensive harbor; large shipping trade; coal, iron, salt, soap. Pop. 10,866.

BONFIRE, a corruption of 'bone-fire,' a fire for burning bones, which spelling was employed in England as late as the latter part of the XVIII. cent., though the alternate spelling had been some time in use. B's were formerly lit in England as beacons, or warnings; the approach of the Armada was so notified to the people. At the present day they are lighted on occasions of national rejoicing.

BONGARS, JACQUES (1554-1612), Fr. diplomatist; edit. works on Fr. and Rom. history.

BONGHI, RUGGERO (1828-95), Ital. politician and educationalist; as Minister for Public Instruction (1873) introduced useful reforms; celebrated for his vivacious but acrimonious wit.

BONGO, negro tribe of Sudan, of medium height, black-haired with a reddish-brown complexion, peaceable and industrious agriculturists.

BONHAM, a city of Texas, the county seat of Fannin co. It is on the

Texas and Pacific and the Missouri, Kansas and Texas railroads, and on the Red River. It is the center of an important agricultural and cotton raising district, and has a large trade in cotton, grain and live stock. Here is Carlton College. The industries of the city include flour mills, cotton and cottonseed oil mills, railroads machine shops, etc. Pop. 1920, 6,008.

BONHEUR, ROSA (1822-99), Fr. artist; was of Jewish parentage; originally a dressmaker; famous for her masterly painting of animals. Her work was highly appreciated in England. *The Horse Fair* is in the Metropolitan Museum of Art, New York.

BON HOMME RICHARD, a famous American warship in which John Paul Jones fought the naval duel with the British ship *Serapis* on Sept. 23, 1779, off Flamborough Head, after his descent upon the Scottish Coast. After capturing the *Serapis* Jones found his own vessel, the *Bon Homme Richard*, so badly battered by the shots of the *Serapis* that he transferred his flag to that ship. The *Bon Homme Richard* sank shortly afterwards.

BONI (4° 40' S., 120° E.), native state, Celebes, Dutch East Indies; inhabitants of Bugis race; rice, tobacco; capital, Boni. Pop. c. 70,000.

BONI, GIACOMO (1859), famous excavator of Rom. remains, especially in Forum at Rome; author of works on Rom. antiquities.

BONIFACE V., pope, 619-25; said to have made Canterbury chief Eng. see.

BONIFACE VIII., BENEDICT CAJETAN, pope (1294-1303), upheld temporal power; quarrelled with several kings; issued bull, *Clericis Laicos*, 1296, forbidding taxation of clergy; captured by Fr. king at Anagni; imprisoned, and died on release.

BONIFACE IX., a Pope who was elected to the office in 1389. He was born in Naples of noble family and became a cardinal in 1381. He died in 1404.

BONIFACE, ST. (680-754), 'Apostle of Germany'; of Eng. birth; began missionary labors in Frisia, 716; founded abbey of Fulda and churches in Bavaria and Franconia; became abp. of all Germany; martyred. To him the conversion of Germany was really due.

BONIFACE OF SAVOY (d. 1270), abp. of Canterbury, 1243; uncle of Eleanor of Provence, Henry III.'s wife.

BONIN ISLANDS (27° 45' N., 142° E.), volcanic islands, N. Pacific, be-

longing to Japan; capital, Port Lloyd, on Peel Island, the largest of the chain; discovered by Japanese, 1593.

BONITO, a fish belonging to the family of mackerels. It is closely allied to the tunny fish. It is found in the Mediterranean, where it preys on the flying fish.

BONIVARD, FRANÇOIS (1493-1570) Cluniac prior of Geneva, hero of Byron's *Prisoner of Chillon*; being imprisoned there for six years by order of Charles III. of Savoy. released when Chillon fell into hands of Bernese, 1536; took refuge at Geneva, accepted the Reformation, and wrote *Chroniques de Geneve*, an unscholarly production.

BONN (50° 44' N., 7° 4' E.), town, Prussia, on Rhine; Minster is Romanesque church, dating from XI cent.; famous univ., established 1808; building was formerly electoral palace; has five faculties, antiquarian museum, and library; fine bridge across Rhine; behind town is Kreuzberg, with monastic church; Beethoven's birthplace. Pop. 87,978.

BONNER, GERALDINE (1870) daughter of John and Mary Sewell Bonner. Removed to West in 1880, finally settling in San Francisco, Cal. Began writing for the San Francisco Argonaut in 1887 and later became its dramatic critic. Among her numerous works of fiction are *Tomorrow's Tangle*, 1902; *The Pioneer*, 1905; *The Castle-court Diamond Case*, 1906; *Rich Men's Children*, 1906; and *The Emigrant Trail*, 1909. Also wrote many short and serial stories for the leading magazines. As a dramatist she is represented by *The Book of Evelyn*, 1913; *The Girl at Central*, 1914; *The Black Eagle Mystery*, 1916; and *Miss Mailand*, *Private Secretary*, 1919.

BONNER, ROBERT (1824-1899), b. in Ireland. He was brought in early youth to the United States and was first apprenticed to a printer. Removed to New York in 1844 and by 1851 was able to purchase the New York Ledger, then an insignificant paper. By his untiring efforts he built up the publication until it became one of the best paying newspapers in the city. He became in later life much interested in trotting horses and owned some of the most famous trotters in the world, among them being Dexter and Maud S. He was widely known for his many charitable donations and benefactions.

BONNET, CHARLES (1720-93); Swiss naturalist and author; made special study of insect life; advanced theory that plants possess sense of dis-

ernment; also formulated a system of philosophy.

BONNEVILLE, BENJAMIN (1795-1878), Am. soldier and explorer; explored the Rocky Mountains (1831-36); an account of his adventures was edit. by Washington Irving. He subsequently served in the Mexican and Civil Wars.

BONNEVILLE LAKE, formerly a lake in Utah which filled a large basin, which is now a desert. It had an area of 30,000 square miles. It is estimated to have been 1,000 feet deep.

BONNIVET GUILLAUME GOUFFIER, SEIGNEUR DE (1488-1525), Fr. soldier; ed. with Francis I., with whom he remained a favorite; admiral, 1515; commanded the army of Navarre, 1521; served in Italy, 1523-25, and was killed at Pavia. He was the implacable foe of the Constable de Bourbon; famed for his wit, his handsome person, and licentious life.

BONNY.—(1) (4° 30' N., 7° 23' E.) port, Nigeria. Pop. c. 20,000. (2) (5° 16' N., 7° E.) river, Nigeria.

BONPLAND, AIMÉ (1773-1858), a French botanist, born in Rochelle. While studying in Paris he became acquainted with Alexander von Humboldt, and accompanied him to the United States. During this expedition he collected over 6,000 plants which were before unknown. On his return to France in 1804 he was made director of the gardens of Navarre and Malmaison. He afterwards went to South America and became professor of natural history at Buenos Aires. He carried on important explorations in South America and finally settled in Brazil, where he died.

BONSAL, STEPHEN (1865), son of Stephen and Frances Leigh Bonsal. Educated at St. Paul School, Concord, and at Heidelberg, Bonn and Vienna, as correspondent in Bulgaria, Servia, Chino-Japanese and Spanish-American wars. Attached to China Relief Expedition in 1900. Saw much service in Central and South American countries. Was secretary of legation in Peking, Tokio, Korea and Madrid from 1891 to 1896. Commissioner of Public Utilities, Philippine Islands in 1914. With American Expeditionary Force during World War, and attached to American Commission at Peace Conference at Paris, in 1919. Besides contributing shorter articles to the leading magazines, is author of *The Real Condition in Cuba*, 1897; *The Golden Horse Shoe*, 1900; and the *American Mediterranean*, 1912.

BONSTETTEN, KARL VICTOR VON (1745-1832), Swiss author; held

advanced liberal opinions which sometimes involved him in difficulties with the authorities, but won for him the regard of many distinguished people, including the Eng. poet, Gray, and Mme de Staël. His best-known work is *L'Homme du midi et l'homme du Nord*, 1824.

BONUS. See **BOUNTY. SOLDIERS' BONUS.**

BONY FISHES, TELEOSTEI, by far the greater number of existing fishes, are grouped together in this order, containing about 10,000 species, including such diverse forms as salmon, herrings, eels, pike, cod, sea-horses, and globe-fishes. The most apparent character which unites the infinite variety of Teleosts is the presence of a skeleton of true bone, as the scientific name indicates. There are many other less evident but as distinctive characters; the tail is altogether formed of what is, in more primitive fishes, only the ventral lobe, which here assumes a false appearance of symmetry (homocercal). The heart has a non-contractile arterial bulb, the optic nerves cross, but do not interlace (deccussate), there is no spiral valve in the intestine, and the air-bladder, except in very rare cases, has ceased to be used in respiration. For the most part bony fishes are protected by thin, overlapping scales, but in some there are bony plates, and in some the skin is naked. Teleosts are among the most modern of fishes, but herring-like examples have been found in rocks of Jurassic Age.

BOOK (A.S. *booc*; Ger. *buch*), the name formerly applied to any written tablet or document; now used to describe a printed literary work, stitched and bound; also the division of such a work, as 'Book II.' of *Paradise Lost*. A modern printed b. is described according to the size of its pages, which size is governed by the number of times a single sheet of printing-paper (*folio*) is folded. Thus a folio b. consists of sheets folded once, forming two leaves, or four pages; in a *quarto* the sheet is folded twice (four leaves eight pages); in *octavo* it is folded three times (eight leaves, sixteen pages), and so on down to smaller sizes. The most common size to-day is *crown octavo* (Cr. 8 vo), which is the size of the usual popular novel, and many other b's; while a favorite smaller size is that known as *foolscap octavo* (Fcp. 8vo), which is often used for b's of verse, and with uncut leaves of *deckle-edged* (untrimmed paper).

The first page of a printed b. is called the *recto*, and usually contains the bare title, or, if it is a long and elaborate one, a portion only, and is known as the

half-title page. The back of it is usually left blank, and is called the *verso*. Then follows the *title-page* proper, bearing the year of publication, though there is a growing tendency at present to print the date on the back of the title-page, as thus: 'First printed in 1912.' The title-page is followed in proper order by the dedication, preface, and contents pages. In early printed b's the name of the printer and the date and place of publication were inscribed at the end of the b.; this appendix (containing sometimes a note as to the nature of the b.) was called the *colophon*. In early printed b's the leaves were not numbered, the pioneer in leaf numeration being a Cologne printer who first made use of it in about the year 1470, while pagination was a product of the XVI. cent. See Duff's *Early Printed Books* (1893); Jacobi's *Some Notes on Books and Printing* (1902). See CENSORSHIP.

BOOKBINDING, the art of making up a book by fastening together the sheets and providing them with an outer cover to protect them. Before the invention of printing, manuscript books were both written and bound by monks, but when printing presses became established towards end of XV. cent., bookbinding became a separate art in which Italy took the lead. In XVII. cent. Fr. binding became prominent, and during early XIX. cent. Eng. binding reached a high position which it still maintains. Books are bound in either leather or cloth, the latter being less strong, but cheaper. The binder folds the sheets which come from the printer into two, four, or eight leaves according as the book is folio, quarto, or octavo, and arranges these in the proper order as indicated by letters, called signatures, printed at the bottom of the first page of each sheet. The sheets are then pressed and saw-cuts made across the back to take the cords with which they are stitched. The back is then hammered and pressed to round it and to form side projections, called joints, to hold the case. In cloth binding the case, consisting of two pieces of mill-board joined by a strip of paper to form the back, is then attached.

BOOKKEEPING, the method of recording business transactions which enables a person engaged in any pursuit involving trade with other persons to know the resulting financial condition of his trading. An efficient system of book-keeping is absolutely necessary for the proper operation of any establishment spending and receiving money or giving and receiving credit in the conduct of its affairs. In manufacturing or merchandizing it will disclose the condition of any account, whether it be to the

credit or debit of the person or persons concerned, the sources of all expenses and receipts, the basic capital and its disposition, and, finally, its multitude of items should be so organized in entries that a concise statement can be prepared clearly showing the profit or loss resulting in any period of transactions and the stability or otherwise of the business. The smaller a business is the more simple the method of bookkeeping practised, and the system known as single entry suffices. It is less troublesome than double entry, but applied to a business that is growing out of the simplicity of single transactions of buying and selling with persons only, it affords no check on fraud or against errors or omissions in keeping accounts. The books commonly used for single entry are a day book and ledger. Sometimes the order book of original entry serves as the day book for debtor entries on the ledger, while bills and invoices do duty as the basis for creditor entries. Payment for goods by a customer, of course, produces an entry in the daybook and ledger cancelling his indebtedness, and payment by the proprietor for stock and other goods call for a similar entry to his credit in the accounts he keeps with firms who supply his needs. Single entry furnishes no data for the familiar balance sheet evolved from double entry, nor for delving into the sources of profit, loss, and cost and other instructive information. Double entry does this; as its name implies, it records both elements of a transaction (there are always two), while single entry registers only one. The simplest system of double entry calls for a day book, a journal and a ledger. The daybook records fully each business transaction as it happens; on the journal the debit and credit items arising out of the transaction are entered, and the ledger entries classify them. The journalizing of transactions admit of many divisions, in fact, in many businesses it spreads over a set of books, one for purchases, one for sales, and one for cash transactions. The ledger duly gets all the entries made in them by postings. A Goods Account (not known in single entry) gets credited with all sales of goods and debited with all purchases of goods. Other books kept are the Bill Book, recording bills receivable and payable; wages book; petty cash book. In the ledger appears Personal Accounts, that is, for each creditor and debtor of the business; Real Accounts, embracing various classes of property; and Nominal Accounts, including wages, rent, interest and discount. The ledger enables a trial balance to be made; this is simply debit and credit columns giving the balances of all accounts in the ledger,

and the two totals should balance. Revenue accounts are also periodically prepared from the ledger records, classifying the various items of loss and gain and showing the condition of a business, whether profitable or otherwise. In the expenses of a merchandising business a revenue account would show the cost of buying and selling goods and the overhead cost of the establishment's upkeep. In manufacturing, the cost of making the goods figures as well.

BOOK-LICE, or DUST-LICE, DEATH-WATCHES (*Psocidae*), a separate order of insects (till recently included in Neuroptera); with small soft bodies, and with or without wings. Two genera, *Clothilla* and *Atropos*, to be seen running actively in quiet apartments, eat the starch paste in bookbindings and are said to cause the nocturnal ticking which is alleged to portend death. A beetle, *Anobium*, produces a somewhat similar noise.

BOOK OF THE DEAD, a collection of religious compositions in hieroglyphic and hieratic characters, compiled by the early Egyptians. The name is misleading, since no single division or chapter of the book deals exclusively with funeral ritual. It is rather an unmethodical compilation of books quite unconnected with each other, relating, among other subjects, to the peregrinations of *Ka* in the valley of the shadow of death and the Osirian doctrine of resurrection. It is a well preserved work, despite its assumed 3,400 years of existence, dating generally from the XVIII. dynasty, and contains 186 chapters, richly illuminated. The British Museum published in 1895 a facsimile of the original papyrus, which was translated. There are other copies in American and European museums. The various papyri composing the book have been also translated into French and German. The vignettes, depicting embalming, funeral possessions, weighing of the heart, etc., as well as the style of writing, underwent marked changes in the course of time. The earliest texts are fragmentary, inscribed on the walls of the tombs, monuments, sarcophagi and mummy cartonnages. The Book of the Dead was copied on papyri by Egyptian scribes and sold to relatives of deceased persons who needed the papyrus, which was placed with the mummy. Poor people had to be content with inferior, slovenly written and abridged copies.

BOOK-PLATES, name given to labels placed inside cover of books to denote ownership; used since 15th cent.; before their introduction covers of books were stamped with owner's personal device.

They are also known as *ex libris*. The earliest known are of Ger. origin, but an O.E. book-plate appears in an ancient folio of Henry VIII.'s library, bearing an elaborate emblematic drawing. Many different designs have been utilized, but the majority are armorial. Many of the best-known artists have designed book-plates, including Dürer, Hogarth, Marshall, and Bewick. Book-plates are now little used, but are in demand by collectors.

BOOK-SCORPIONS (*Pseudoscorpionidae*, an order of Arachnids), minute, scorpion-like creatures found in warm regions lurking within books or in dark confined places. They feed upon the juices of insects.

BOOLE, GEORGE (1815-64), Eng. logician and mathematician; b. Lincoln; started life as a teacher; afterwards proprietor of a school; prof. of Math's, Queen's Coll., Cork (1849); pub. treatise on *Differential Equations* (1869), and on *Calculus of Finite Differences* (1860).

BOOM (51° 5' N.; 4° 22' E.); town, Belgium. Pop. 13,600.

BOOMERANG, curved or angular hardwood weapon used by savage tribes in Australia and Africa, also by the Dravidians of India. It is used in warfare or to kill animals; one form is so constructed that it returns to the sender.

BOONE, a city of Iowa, the county seat of Boone co. It is on the Chicago and Northwestern, the Chicago, Milwaukee and St. Paul, and other railroads, and is 36 miles northwest of Des Moines. The city is an important coal mining center and its industries include the manufacture of flour, brick, tile and pottery, and the mining and shipping of coal. Pop. 1920, 12,451.

BOONE, DANIEL (1734-1820), Amer. backwoodsman; won fame as a fearless Indian fighter; a great hunter and trapper; explored Kentucky region.

BOONTON, a city of New Jersey, in Morris co. It is on the Lackawanna Railroad, the Rockaway River, and the Morris Canal. Its favorable situation makes it a favorite residential town. It is also important industrially and has manufactures of storage batteries, hats, bronze, silk, rubber, etc. Its public buildings include a public library and an opera house. Pop. 1920, 5,381.

BOORDE, ANDREW, BORDE (c. 1490-1549), Eng. physician, traveler, and author; wrote, among other works, *The First Boke of the Introduction of Knowledge*, on account of his European travels with geographical descriptions.

BOOTH, BALLINGTON (1859), son of William and Catharine Booth. His father was the founder of the Salvation Army. He early identified himself with the Salvation Army and in 1885 was given the command of the branch in Australia. Came to the United States in 1879 and from then until 1896 was in command of the Salvation Army. In this year he withdrew from the Salvation Army and formed an independent religious organization known as the Volunteers of America. Has since been its general-in-chief and president. He was ordained into the ministry in 1896.

BOOTH, BARTON (1681-1733), Eng. actor; ed. Trinity Coll., Cambridge; played at the Haymarket and Drury Lane theatres; buried in Westminster Abbey.

BOOTH, CHARLES (1840-1916), Eng. sociologist; chairman of the Booth Line of steamships; has devoted much time and money to social questions; author of *Life and Labour of the People in London* (1891-1903); P.O. (1904); F.R.S., etc.

BOOTH, EDWIN THOMAS (1833-93), Amer. actor. He made his first appearance at Boston (1849). After years of struggle, by means of his striking personality, and the charm of his elocution, he became generally recognized as the greatest Shakespearean actor the Amer. stage has produced. In his later years he alternated the chief parts in *Othello* with Sir Henry Irving, at the Lyceum. Undertook short engagement with Salvini in New York (1886), and following year formed combination with Lawrence Barrett that lasted till Barrett's death (1891). Apart from the high quality of his acting, he was remarkable for his artistic taste and his lavish generosity.

BOOTH, JAMES CURTIS (1810-83), Amer. chemist, established at Philadelphia the first laboratory in the U.S. for instruction in analytical chemistry; was the first to introduce nickel as an alloy in the U.S. coinage.

BOOTH, JOHN WILKES (1839-65), Amer. actor, left the stage in 1863, and became a Secessionist plotter. He shot President Lincoln, April 14, 1865, and refusing to surrender, was himself shot.

BOOTH, JUNIUS BRUTUS (1796-1852), he received a classical education and at the age of seventeen he entered upon his stage career. His first pronounced success was in Richard III., played at Covent Garden, London. In 1821 he came to the United States and from his first appearance he acted with great success.

BOOTH, MAUD BALLINGTON (1865), daughter of Rev. Samuel and Maria Charlesworth Booth. Educated at Belstead, Eng., and in Switzerland. Married Ballington Booth in 1886. Came to the United States in 1887 and from then until 1896 was prominent in the activities of the Salvation Army. She aided her husband greatly in organizing his new work, the Volunteers of America. Is in charge of extensive prison work throughout the United States. She is the author of the following works: *Branded* (1897); *Lights of Childhood* (1901); *After Prison What?*; *Twilight Fairy Tales* (1906).

BOOTH, WILLIAM, 'GENERAL' (1829-1912), Eng. home missionary; resigned ministry in Methodist New Connexion (1861) and in 1865 established the Christian Mission, out of which developed the Salvation Army, in the East End of London. Booth as 'General' was granted almost absolute power, and became one of most prominent individualities of Eng. life, as his Army had become feature of almost every British town and village, besides spreading almost over the whole world; costume is navy blue serge uniform, blue cape for men, and blue straw for the familiar Salvation Army 'lassies.' The teaching is emotional Christianity, doctrinally broad; they earnestly fight 'the drink,' and are noted for their patience with apparently hopeless drunkards and jail-birds. Booth organized Rescue, Maternity, Prison-gate, and Children's Homes, Slum Posts, Shelters for Homeless, Food Depots, Labor Bureaux, and Farms at home and abroad. In this social work the Army has proved especially successful. He wrote *In Darkest England and the Way out* (1890).

BOOTH, W. BRAMWELL (1856); eldest son of above; succeeded his father (1912) as general of Salvation Army; presided at International Congress in London (1914). A masterly organizer; is author of several religious pamphlets and books.

BOOTHBY, GUY NEWELL (1867-1905), novelist; born in S. Australia; lived for many years in England, and there wrote his well-known sensational novels, including *The Beautiful White Devil*, *Dr. Nikola*, etc.

BOOTHIA, FELIX (70° N., 96° W.); peninsula, N. America; discovered by Sir John Ross (1829-33); contains Magnetic Pole.

BOOTLE (53° 27' N., 3° W.); town, Lancashire, England; practically part of Liverpool. Pop. 1921, 77,800.

BOOTS, covering for the foot. The ancient Greeks wore sandals, as did the Roman plebeians, but the Roman patricians wore leather b's. The Early Britons probably wore sandals, and, in later times, b's made of skins. The b. first became prominent in England when a fashion was introduced, during the reign of Edward IV., of wearing b's with such ridiculously long points that they had to be supported by light chains depending from below the knee. In Early Tudor times an ugly broad-toed b. was worn by men, as may be seen in pictures of the period. During the reigns of Charles I. and II. b's with bag-like open tops were the fashion. After these came the *Jack-b.*, the *Hessian* and the *Wellington b.* Buckled ankle shoes were also commonly worn from the time of the Early Stuarts. In Georgian days they were worn with high, red heels. One of the chief centers of the modern b. industry is Northampton.

BOOTS AND SHOES. The manufacture of footwear is a leading American industry, mainly centered in New England, where it became established with the first colonial settlement in Massachusetts. American improvements in machinery and devices generally for producing footwear early revolutionized the industry and set the pace to the adoption of similar methods of production in other countries. The boot and shoe industry of no other nation, however, has reached the high level and volume attained by American manufacturers, whose preeminence in invention, methods and equipment becomes firmer established year by year. They produce footwear of a style and durability that has created a market for Am. shoes in every land. In 1921, for example, 8,957,697 pairs of shoes (children's, men's and women's) were exported of a value of \$24,678,701. The entire production of boots and shoes in that year, as reported by the U.S. Census Bureau in 1923, amounted to 284,660,000 pairs. This is not a normal output but rather a temporary decline. The industry, in common with business generally, suffered by the post-war depression, which reached its peak in 1921 and curtailed or restricted production and reduced prices to nearly pre-war levels. In 1919 331,225,000 pairs of boots and shoes were produced, and in 1914, 292,666,000 pairs. Of the 1921 output of 284,660,000 pairs, women's footwear predominated (101,140,000 pairs); then men's (69,358,000 pairs.). The manufacturing establishments in that year, including cut stock and findings, numbered 560, whose total products had a value of

\$111,809,000, as against 679 establishments with a total production of \$224,028,000 in 1919. The figure thus shows quite a setback in footwear manufacture in 1920.

In the United States a shoe is any type of footwear that does not extend above the ankle. In England 'shoe' is generally applied to footwear whose covering stops at the ankle, that is, the American 'low shoe,' or the Oxford or Derby 'tie' in English parlance. Footwear become boots in the United States when they reach above the ankle, even to the knee and beyond. In England they are boots only when they reach the shin; extended beyond that point they become top-boots or Bluchers (half boots) or Wellingtons (reaching the knee), the last named displacing the Hessian type, but are now rarely seen in England. In practice American 'shoes' and English 'boots' are synonymous.

Footwear had its origin in the sandal, which protected the soles of the feet and was not an adornment. The primitive sandal slowly acquired additions and ornamentation with the dawning and growth of culture and aesthetics and thus the modern shoe or boot acquired its present forms. The Egyptians were among the pioneer sandal-makers and the tools they used are not unlike those employed by the modern cobbler. The Romans wore the sandal, but in their empire-making they came in contact with other peoples and absorbed their diversities of dress, footwear among them, and thus came to wear shoes, boots and buskins. But it was not until the Middle Ages, with its renaissance in art and culture, that modern footwear had its beginnings. Many styles arose embracing the crude mocassin-like shoe of rawhide or roughly tanned, with its thongs as fastenings, worn by peasants; the heelless slipper-like shoe with spurs; ankle-high shoes with sharp or turned-up points; low shoes with heels and large buckles; high tight boots, heelless with pointed toes, each leggin differing in color; knee boots proclaiming their wearer as knights; the 'jack boot,' as worn by the British Horse Guards today; and the fanciful footwear styles of the French in heels and buckles.

The machinery era of the 19th century brought boots and shoes to their modern perfection as factory products. It gradually displaced the ancient craft of shoemaking, represented by the local or itinerant shoemaker or cobbler, who produced hand-made footwear of entire families, though for a long time machine and manual production went on side by side. The industry did not begin to grow to its present proportions till the invention of the sewing machine. Now-

adays, except for repairing, there is scarcely such a thing as hand-sewing in shoe manufacture. In the United States the slow operation of handwork began to be discarded with the invention of the McKay Stitching machine, which came into active use in 1861 and proved of valuable service in the supply of footwear to Union troops in the Civil War. It automatically sewed the outer sole to the inner sole by a strong chain stitch. Other machines came into operation about this time and later, among them the leather-rolling machine, which pressed the leather to the right consistency, a laborious task previously done on the lapstone; leather sewing machines for stitching the uppers with wat thread and attaching them to the sole; splitting devices for dividing leather or giving it a uniform thickness; machines for cutting the soles and other parts of a shoe on a fixed pattern; the screw machine, which cut individual layers for heels, assembled and nailed them together, and attached them to their place on the sole; and welt sewing machines, which produce shoes with smooth interiors adaptable to feet with irregularities. In fact, every operation in the production of boots and shoes is now accomplished by machinery. In one large American plant, devices are in use that effect 170 different operations on a single pair of shoes, which pass through 210 pairs of hands in the process. A standardization in manufacture and styles has resulted generally from the immense volume of production made possible by perfected machinery applied to every detail of shoemaking.

Throughout Europe and America the modern machine-made boot and shoe has generally supplanted all other types of footwear, but in other parts of the world, racial customs sanctify the retention of ancient forms of feet-coverings. Workers in China still wear the sandal made of woven reeds, while the thick-soled, quilted slipper (familiar in pictures) marks the merchant and others of that social grade. The sandal and low shoe of their ancestors, sometimes of costly leather and richly ornamented, is religiously clung to by the people of India, Turkey and Arabia. Then there are top-boots worn in Russia and in the Balkans, the sabots or wooden shoes seen in Holland, Belgium, France and Germany, and the Esparto grass sandals and slippers used in some parts of Spain. Of sabots it may be said that they are now being manufactured in quantities for domestic use in the United States.

BOPP, FRANZ (1791-1867). Ger. philologist; prof. of Sanskrit at Berlin (1821); famous *Comparative Grammar*,

in six parts (1833-52).

BORACIC ACID, BORIC ACID (H_2BO_3), obtained from hot springs and jets of steam and gases in volcanic districts in Tuscany, Lipari Islands, and Western America, or prepared pure from borax; a weak but very generally useful antiseptic.

BORACITE ($2Mg_3B_2O_{11} + MgCl_2$), mineral salt of magnesium, boric acid, and magnesium chloride; occurring in isometric tetrahedral crystals, transparent, vitreous, or adamantine, colorless, white, or yellowish green; having pyro-electrical properties and being doubly refractive.

BORAGINACEÆ, herbaceous plants, leaves alternate, hairy; flowers, salver wheel or funnel-shaped, blue or purplish; mucilaginous, containing alkalies, roots often yield dyes. Borage (*Borago officinalis*), favorite ingredient in claret cup; *Anchusa* (Alkanet) yields dye; *Symphytum* (Comfrey); *Myosotis* (Forget-me-not).

BORAH, WILLIAM EDGAR (1865), son William N. and Eliza Borah. Educated at Southern Illinois Academy and University of Kansas. Admitted to bar in 1889, practicing at Lyons, Kans., until 1891 and since then at Boise, Idaho. Elected to the United States Senate in 1903 and re-elected for each succeeding term of six years since. His present term expires in 1925. He belongs to the Progressive wing of the Republican party and is a prominent and powerful figure in all legislation. He was a pronounced supporter of measures for the effective prosecution of the World War and a vigorous opponent to the ratification of the Versailles Treaty of Peace.

BORAS (57° 44' N.; 12° 57' E.), town, Sweden. Pop. 25,000.

BORAX ($N_2B_2O_5$); white crystalline substance, dirty yellow in native state, occurring in *tincal*; bicarbonate of sodium; antiseptic properties; used in soldering, glazing pottery, glass manufacture, and as a preservative.

BORCHGREVINK, CARSTEN EGE-BERG (1864), Arctic explorer, native of Christiania; commanded Southern Cross expedition (1898); wrote *First on the Antarctic Continent*, etc.

BORDA, JEAN CHARLES DE (1733-99), Fr. scientist and marine specialist; forwarded scientific navigation.

BORDEAUX, town, Gironde, France (44° 50' N., 0° 35' W.); in midst of great wine, fruit, grain, and timber-producing country; trading center; third seaport in France; exports wine, brandy, hides,

wool, fish, fruits, sugar, coffee, oil, resins, cottons, machinery, etc. Archbishop's see; cathedral, fine churches; town hall, museums, theatre, library, hospital; courts of appeal and commerce; univ., various educational institutions; taken by Romans, afterwards held by Goths; passed to France and then to England with Eleanor of Aquitaine; French since 1453. During World War, when the Germans were threatening Paris in 1914, Bordeaux became seat of Fr. Government for some time. Pop. 261,700.

BORDEN, GAIL (1801-74) American inventor; born Norwich, N.Y. In 1822 he removed to Mississippi, where he taught school and held minor political offices. In 1829 he went to Texas, was elected delegate to the convention that sought to obtain freedom from Mexican rule and was active in the struggle that followed. After the republic of Texas was established, he was appointed by President Houston collector of the port of Galveston. The need of suitable supplies for emigrants crossing the plains led him to turn his attention to the making of concentrated food, with the result that he produced the 'meat biscuit,' which won for him a medal at the London World's Fair of 1851. Later he came North and secured in 1856 a patent for condensed milk. This was the basis of the great fortune he amassed, which was later augmented by other processes patented by him for the condensing of beef, fruits, tea, coffee and cocoa.

BORDEN, RT. HON. SIR ROBERT LAIRD (1854), Canadian statesman, born at Grand Pré, Nova Scotia; admitted to Canadian bar (1878); elected member of the House of Commons for Halifax, Nova Scotia (1896); became leader of Conservative opposition on resignation of Sir Charles Tupper (1901); was defeated for Halifax (1904), but returned for Carleton, Ontario (1905), and Halifax (1908, 1911, 1917). He became premier (Oct. 1911) when Laurier government was defeated on the reciprocity question; brought forward bill (1913)—which was rejected by the senate—for Canadian contribution of three battleships to the British navy; at outbreak of the Great War he zealously supported imperial government, and was the first overseas minister to be summoned to a meeting of the British cabinet. In Oct. 1917 he formed a coalition cabinet, and after general election in Dec. retained his premiership, and enforced conscription law. He represented Canada at the Paris Peace Conference (1919). Illness compelled him for a time to relinquish duties of his office.

BORDENTOWN, a city of New Jersey, in Burlington co. It is on the Delaware and Raritan Canal and on the Pennsylvania Railroad, 67 miles south west of New York City. Bordentown has many interesting historical remains and is noted for being the former residence of Joseph Bonaparte, brother of Napoleon I. It is the seat of Bordentown Military Institute and other educational institutions. Its industries include steam, forge and iron works, foundry and machine shops, canning factories, etc. Pop. 1920, 4,371.

BORDERS, THE (c. 55° to 55° 45' N., 1° 30' to 3° 30' W.), district on both sides of Cheviot Hills, Scotland and England; surface generally moors and hills; long inhabited by Cymric race, who were displaced by Saxons and Norsemen; was part of Northumbrian kingdom, annexed to England, X. cent.; scene of many feuds and incessant warfare for many cent's.

BORDER STATES was a term applied in and before the Civil War to those slave states that adjoined the more southerly of the free states. They were Delaware, Maryland, Virginia, Kentucky and Missouri. They formed a wedge between the North and South, and owing to their situation in the event of war did their utmost to stay hostilities. North Carolina, Tennessee and Arkansas have been mistakenly included among them. Because the Border States would be the chief battlefield in any war, they were the inspirers and chief supporters of every political movement to stop the slavery agitation and to conciliate the sections. As slave states they had decided leanings to the South, but they were loath to be drawn into a conflict. When the Civil War came Kentucky even tried to exercise neutrality, forbidding both North and South forces to occupy State territory without the consent of the State authorities. The war, however, forced a break-up according to their affinities. In Kentucky, Maryland, Delaware and Missouri, the loyal element, with the Union government's help, prevented the states from joining the South. Virginia alone seceded, with North Carolina, Tennessee and Arkansas.

BORDONE, PARIS (1495-1570), Ital. artist of Venetian school; painted portraits and scriptural and mythological subjects; his work has much in common with that of Titian, whose style he followed very closely; examples in the Louvre, National Gallery, Venice Academy, and many other continental galleries.

BORDURE, heraldic term for border,

either blank or charged, of shield.

BORE.—(1) wall of water formed at mouths of certain tidal rivers by narrowing of the banks; 2 or 3 ft. high in Severn, Trent, Solway, Dee, 12 ft. in Brahmaputra (see TIDES). (2) hollow in barrel of gun, or diameter of barrel.

BOREAS (classical myth.), the north wind; s. of Astræus and Eos; generally represented as a vigorous, winged youth in the act of flying through the air.

BORELLI, GIOVANNI ALFONSO (1608–79), Ital. physician and physicist; prof. of Math's (1649), Messina and (1656) Pisa; prof. of Med. (1657), Pisa. The first to apply math's to animal physiology.

BORGERHOUT (51° 13' N., 4° 26' E.), town, Belgium; suburb of Antwerp. Pop. 50,000.

BORGHESE, Sienese family afterwards settled at Rome and distinguished as patrons of art. Camillo B., who became cardinal, 1596, and pope as Paul V., 1605, bought the B. Palace and built the B. Villa at Rome early in XVII. cent. Camillo Filippo Ludovico B. (1775–1832) m. Napoleon's beautiful sister Pauline, was created prince of Guastalla (1805), and sold to Napoleon the art treasures, most of which are now in the Louvre, of the B. Villa; he separated from Pauline after Napoleon's fall. His nephew, Camillo, was War Minister, 1848; Paolo was compelled to sell the remaining possessions of the family in 1892, and while Pope Leo VIII. added its muniments to the Vatican MMS., the Ital. government acquired the Palace and valuable collections of paintings.

BORGIA, CESARE (1476–1507); s. of Rodrigo Borgia, Pope Alexander VI.; cr. cardinal (1493); released from ecclesiastical vows (1498); invested by Louis XII. with counties of Valentinois and Diols and title of duke; m. Charlotte d'Albret (1499); subsequently became Duke of Romagna, but his dominions and power greatly lessened on his f.'s death (1503), and election of Pope Julius II. (Julian della Rovere), enemy of Borgias. Cesare was killed while besieging castle of Viana (March 12, 1507); was a clever, unscrupulous adventurer.

BORGIA, LUCREZIA (1480–1519); sister of Cesare; puppet of the schemes of her f. and bro.; her 3rd husband was Alphonso d'Este, Duke of Ferrara; in high repute at death as patroness of culture, but her name afterwards became synonymous, probably unjustly, with civilized cruelty and vice.

BORGIA, ST. FRANCIS, succ. his father as Duke of Gandia, 1543; joined newly founded Soc. of Jesus, becoming general, 1565; had he wished might have been cardinal; canonized, 1671.

BORGLUM, JOHN GUTZON DE LA MOTHE (1867), American sculptor and painter; born Idaho. He was educated at St. Mary's College, Kansas. His first studies in painting were pursued at the San Francisco Art Academy. In 1890 he went abroad, and for the next three years studied at the Académie Julian and l'Ecole des Beaux-Arts, Paris. From 1896 to 1901 he was a frequent exhibitor in London and Paris, his work receiving favorable attention from critics and the public. He returned to New York in 1902. Though his art is individual and original, he was strongly influenced by Rodin in sculpture and Whistler in painting. To his extremely able technique he joins a vivid imagination and an appreciation of the Ideal. He has produced many notable works in sculpture, among which may be cited: *Pursued*, *The Boer* (an equestrian figure) statues of Lincoln and Henry Ward Beecher, colossal figures of the Twelve Apostles for the Cathedral of St. John the Divine, New York City, *Wonderment of Motherhood*, *Modern Atlas*, *Night*, *Babes in the Wood* and the Sheridan Monument at Washington, D.C. His paintings include *Abandoned*, *Captive Pan* and *Iago and Cassio*. He has received numerous medals at expositions and is an honorary member of many societies in America and abroad.

BORGOGNONE, AMBROGIO (c. 1450–1523), Ital. artist; famous for his church decorations, examples of his best work are to be seen in the Certosa, at Pavia, and the church of San Satiro, Milan; two small examples in the London National Gallery.

BORGU (18° 15' N., 18° 30' E.); district, basin of Niger, W. Africa; western part included in Fr. Dahomey; eastern part forms province of Brit. Nigeria; chief town, Kiama; rice, grain.

BORING, process of penetrating substances such as rocks, in mechanical and engineering operations. For b. soft wood awls are used, but for hard wood gimlets, augurs, or brace and bit are employed. Hand drills of steel and bit are used by jewelers, whilst machine drills are used for b. metals.

B. is also used in connection with prospecting for minerals; in sinking petroleum or artesian wells; in determining the depth of rock below the surface preparatory to mining, and in geological investigations. The first

practical b. machine was used at Mont Cenis tunnel, and was invented by Sommeiller. In modern tunnel (q.v.) construction a shield fitted with diamonds as cutting agents is used. The shield is made to rotate, and is at the same time pressed against the face of the rock. The diamonds are not even scratched owing to their extreme hardness.

BORIS III. (1894), Tsar of Bulgaria; succeeded to throne on abdication of his father, Ferdinand, in Oct. 1918.

BORIS, FEDOROVICH GODUNOV (c. 1551-1605), Russ. Tsar; served at Russ. court; his sister, Irene, m. Theodore, s. and successor of Ivan the Terrible. Boris became omnipotent as guardian of Theodore, and succ. him as Tsar of Russia (Feb. 1598); a pacific, prudent ruler.

BORNEO, large isl., Eastern Archipelago, between Australia and Fr. Indo-China, immediately N. of Java (7° N.-4° S., 109°-119° 15' E.); extreme length, over 800 m.; breadth, over 600 m.; bounded E. by Mindoro and Celebes Seas, Macassar Strait; S. by Java Sea; W. and N.W. by China Sea. Labuan, an isl. off N.W. coast of Borneo, was incorporated with Singapore (1907). About two-thirds of isl. in S. E. and S. are claimed by Dutch, while N. and N.W. (states of N. Borneo, Brunel, and Sarawak) belonging to Britain. Mountain ridge runs from N.E. to S.W., height ranging from 8,000 ft. in N.E. to 3,500 in S.W.; in extreme N., Kinabalu range reaches height of 13,700 ft.; interior mountainous, with rich river valleys and marshy plains; principal rivers, Barito, Kapuas; coast is low and swampy. Best bays are in Brunel and Brit. N. Borneo. Mean ann. temp. c. 80° F.; rainfall is heavy, averaging 120 in. per annum.

Forests produce ironwood, teak, sandalwood, ebony, india rubber, damar, camphor, pepper, cloves, nutmegs, cinnamon, ginger, betel nuts, sago, coco-nuts, gambier, bamboo, canes, etc. Rice, sugarcane, sago, tapioca, coffee, earth-nuts, indigo, maize, hemp, cotton, tobacco, are cultivated; in Brit. part chief products are pepper, gambier, sago, rice. Minerals include coal, iron, petroleum, gold, antimony, quicksilver, platinum, diamonds. Edible birds' nests, trepang, pearls, and tortoise-shell are obtained. Exports are pepper, spices, gold dust, diamonds, drugs, timber, canes, gutta-percha, indiarubber, and many of above productions; imports general goods, clothing, machinery, hardware, opium, rice. Chief town of Sarawak, Kuching; of Brunel, Brunel; of Brit. N. Borneo, Sandakan; of Dutch

Borneo, Bandjermasin. Excepting Australia and Papua, Borneo is the largest isl. in the world. Area, c 289,000 sq. m.; pop. c. 2,000,000, including Dyaks, Malays, Arabs, etc.

History.—Borneo was discovered by Portuguese early in 16th cent.; during 17th cent. unsuccessful attempts were made by Spaniards, Portuguese, Dutch, and English to establish trading stations. First permanent settlement was that made by Dutch at Bandjermasin in 1733; Dutch proceeded to make further settlements, and have mastered most of island. In 1838-41 the Malay pirates were suppressed by Rajah Brooke, who founded independent state of Sarawak, which became Brit. protectorate in 1888. In this year Brunel also came under Brit. rule. See MAP EAST INDIA ISLANDS.

British North Borneo is under administration of Brit. N. Borneo Co., which obtained royal charter in 1881; governor, appointed subject to approval of secretary of state, administers affairs in Borneo, and there is court of directors in London. Its area is about 31,106 sq. miles; pop. 208,200.

Dutch Borneo comprises two administrative dists.; of these W. Borneo occupies about 55,825 sq. m.; pop. 573,600; while E. and S. Borneo have area of 156,912 sq. m.; pop. 940,800.

BORNHOLM (55° 6' N., 15° E.), Dan. island, Baltic; lighthouses; exports freestone; capital, Rønne. Pop. 41,000.

BORNIER, HENRI, VISCOMTE DE (1825-1901), Fr. poet; author of two poetic plays produced at the Comédie Française—*La Mariage de Luther* and *La Fille de Roland*—the latter of which achieved a popular success; *Poésies complètes* (1894).

BORNU (c. 12° 20' N., 12° 20' E.), state, Central Africa, W. and S. of Lake Chad; area estimated at 57,000 sq. miles; surface flat, with branches of Komaduga R. flowing to Lake Chad; climate very hot and unhealthy; produces indigo, maize, millet, cotton, ground-nuts; imports calico, sugar, salt; administered by Brit. resident with several assistants; native chief still recognized; people are negroes and half-breeds. See MAP AFRICA.

B. was independent state in Middle Ages; considerable prosperity in XV. cent.; struggle began in early XIX cent., against the Fula, who were ultimately defeated and expelled by fakir Muhammad el Anim; subject to Brit. control since 1902. Chief towns, Kuka and Maidugari. Pop. c 4,000,000.

BORO-BUDUR, remains of ancient Buddhist temple, Java.

BORODIN, ALEXANDER PORFYRIEVICH (1834-87), Russian composer; ed. for the medical profession, which he abandoned for music; became a brilliant executant on several instruments. His compositions were distinctly Russian in character and consist of symphonies, string quartets, songs, and an opera, *Prince Igor*.

BORODINO (55° 45' N., 35° 33' E.), village, Russia, on Kolotscha; here Napoleon defeated Russians under Kutusov, Sept. 7, 1812, making them cede Moscow; heavy losses both sides.

BORON. B. A non-metallic element, having the atomic weight 11.0. It occurs in nature as boric acid and in several minerals, including borax, boracite, hydroboracite, rhodizite, etc. It never occurs free. It was first isolated by Gay-Lussac and Thenard in 1808, by heating boric acid with potassium. It is now commonly prepared by heating boric acid with magnesium and treating the residue with dilute hydrochloric acid. In the pure state it is a chestnut brown soft powder, having a density of 2.45. It has no taste or odor, and is characterized by its property of staining the fingers. On heating in the air it burns with a reddish flame, forming the oxide, B_2O_3 , and the nitrate BNO_3 . It is insoluble in water, but is dissolved by strong nitric acid in the cold, and by sulphuric acid with the aid of heat, in each case, the oxide B_2O_3 , being formed. *Crystalline Boron* may be produced by heating a mixture of boric acid, aluminum and charcoal at 1500° C. for five hours, dissolving out the aluminum with soda, and boiling the residue with hydrochloric and hydrofluoric acids. The crystals are never pure, but always contain some carbon, or aluminum or both. The hardest variety of boron crystals known contain about 2.4 per cent. carbon. They have a metallic appearance and are black or very dark red in color. So-called 'boron diamonds' are colorless transparent crystals, with a chemical constitution represented by the formula $B_{10}C_2Al$. Boron is used commercially chiefly in the form of its compounds, boric acid and borax, but it finds some application in metallurgy. Boron steel has properties, similar to those of high grade hard carbon steel. It imparts to the steel a high tensile strength.

BOROROS, THE, people of S.W. Brazil, probably akin to Patagonians; average stature over 6 ft. 4 in.

BOROUGH (A.S. *burh*, a fortified stronghold or camp), the name of a town possessing certain governmental rights. In many places an Anglo-Saxon 'burh'

grew up on or near the site of a Roman colony, but the case is not proven for the former developing out of the latter. The 'burh' was the stronghold of a king or a tribe, with a 'wall' or 'hedge' around it. It often became a political, military, and commercial center. In the X. cent. the b. court or 'moot' first appears, with a definite area of jurisdiction, but the feudal castle of the Norman conquerors sometimes overshadowed it. 'Royal boroughs' were created by the king; the burgesses paid certain annual rents to him. Various privileges were granted by successive kings to London. The name is used for township in Pennsylvania.

BOROUGH, STEVEN (1525-84), Eng. navigator; b. Northan, Devon; accompanied Sir Hugh Willoughby (1553) in his search for a northern passage to Cathay; discovered Kara Strait (1556). His bro. William Borough (1536-99), commanded the Lion in Drake's Cadiz expedition (1587); wrote *A Discourse of the Variations of the Compass* (1581).

BORROMEAN ISLANDS (45° 54' N., 8° 35' E.), four islands, Lake Maggiore, Italy.

BORROMEO, CARLO (1538-84), saint and cardinal; studied at Pavia; cr. cardinal and abp. of Milan by his uncle, Pope Pius IV., 1560; took part at Council of Trent; did much for moral reform of Church and foundation of educational establishments; canonized. 1610.

BORRON, ROBERT DE, and ELIE DE B. (fl. XII. cent.), Fr. trouvères who gave final form to the Arthurian story.

BORROW, GEORGE HENRY (1803-81), Eng. author and philologist; b. Norfolk; s. of a soldier; apprenticed to a solicitor; in 1824 went to London and found work as a publisher's hack. In 1833 he entered the employment of the Bible Society, and was sent to St. Petersburg, and afterwards to Spain. In the latter country he associated with the Zinca, in whose language he found a close affinity with that of the Norfolk gypsies he had known in his youth. He returned to England in 1839, and in 1841 pub. *The Zinca*, an exhaustive work on the gypsy languages. It was followed by *The Bible in Spain* (1843); *Lavengro* (1851); *The Romany Rye* (1857); *Wild Wales* (1862), and his most important philological work, *Romano Lavo Löl* (1874).

BORYSTHENES (46° 32' N., 32° E.), old Gk. colony at mouth of B., now called the Dneiper, S.W. Russia; founded

by Milesians (VI. cent. B.C.).

BORZOI, Russ. wolfhound; has long powerful jaws, narrow but deep chest, white coat; height, 26-33 in.

BOSBOOM-TOUSSAINT, ANNA LOUISA (1812-86), Dutch novelist; famous as writer of hist. stories, including *The Earl of Devonshire*, *Leicester in the Netherlands*, *The House of Laurenesse*, and *Gideon Florensz*.

BOSCAWEN, EDWARD (1711-61), Eng. admiral; s. of Viscount Falmouth; performed brilliant service at siege of Cartagena (1741); at Cape Finisterre (1747); besieged Pondicherry (1748); took Louisburg (1758); crushed Fr. naval power in Lagos Bay (1759).

BOSCH, JAN VAN DEN, COUNT (1780-1844), Dutch statesman; gov. of East Indies, 1828-33; Sec. for Colonies, 1833-39.

BOSCOBEL (52° 42' N., 2° 22' W.), parish, Shropshire, England; contains house where Charles II. hid after Worcester (1651).

BOSHOF (28° 50' S., 25° 18' E.), town, Orange Free State, S. Africa; British defeated Boers, 1900.

BOSHER, KATE LANGLEY (1865), author; born Norfolk, Va. She graduated from the Norfolk College for Young Ladies, 1882. She became widely popular as a writer because of the whimsical humor and clever characterization that distinguish her work. Her publications include *Mary Cary* (1910); *Miss Gibbie Gault* (1911); *The Man in Lonely Land* (1912); *The House of Happiness* (1915), and *Miss McFarlane* (1918).

BOSNA SERAI, SARAJEVO (43° 54' N., 18° 30' E.), fortified town, capital of Bosnia. Pop. 55,000.

BOSNIA - HERZEGOVINA, dists., Jugo-Slavia (44° N., 18° E.); Dinaric Alps run from N.W. to S.E., surface sloping thence N.E. to Save basin, S.W. to Adriatic. Herzegovina, in S., is bare and rocky; Bosnia, to N., has mt., forests and fertile valleys; chief rivers, Save and its affluents; large part of surface wooded—lime, beech, pine, larch. Great majority of population are engaged in agriculture; chief crops—tobacco, grain, fruits, beet, flax, hemp; cattle, sheep, swine, horses, mules, are largely raised; silk culture is being introduced, and wine is made; anthracite and iron ore mined. Exports include timber, fruit, coal, iron, chemicals, live stock; imports include oils, coffee, beer, wine, spirits, wool, cottons, silk, grain, flour, rice, paper, leather, glass, china, hardware, machinery, soap. Cap. of Bosnia,

Serajevo; of Herzegovina, Mostar. There are ry. communications with Brod on Danube and Gravosa on Adriatic; mileage over 1,200.

Inhabitants are Croato-Serbians; Span. Jews, gypsies, and colonists of other nationalities also represented. Principal religions are Oriental Orthodox, Mohammedan, R.C., and there are some Jews, Evangelicals, and other Christians. Education is free, and, under certain circumstances, compulsory. Area, 19,760 sq. m. Pop. 1,900,000.

History.—The Slav settled in Bosnia in 6th and 7th cents., and for a time maintained their independence; subject to Hungary, 11th-13th cent.; to Serbia in 14th cent., attaining independence under Twartko in 1370. After latter's death the kingdom began to decline and became involved in war with Turks, who ultimately subdued Bosnia in 1463, Herzegovina in 1483. Under Turkish rule natives were cruelly oppressed; Christians constantly persecuted; murder was considered no crime, robbery and brigandage were recognized professions. Revolts occurred in 1849 and 1875. In 1878, by Treaty of Berlin, provinces were handed over to Austria-Hungary for administration and military occupation; in 1908 they were definitely annexed to that empire; discontent culminated in murder of Archduke Francis Ferdinand (June 28, 1914), Austria's ultimatum to Serbia, and the World War. In 1918, on dissolution of dual monarchy, the provinces joined Jugo-Slav state. See MAP CZECHO-SLOVAKIA.

BOSPORUS, BOSPHORUS (41° 10' N., 29° 5' E.), strait between Black Sea and Sea of Marmora. See TURKEY, DARDANELLES; WORLD WAR.

BOSPORUS CIMMERIUS (45° 15' N., 36° 30' E.), old name for strait between Azov and Black Seas; length, c. 23 miles; width, 2 to 22 miles; district traditionally inhabited by Cimmerii; formed independent kingdom, V. cent. B.C.; conquered by Mithridates of Pontus, 115 B.C.; belonged in turn to Sarmatians, Chersonesians, Tartars; modern Kerch or Yenikale.

BOSS, the raised outside center of a shield, or buckler; a protuberant ornament; in arch., a projecting ornament; colloquial (of Amer. origin), an employer, a master-workman.

BOSSI, GUISEPPE (1777-1816), Ital. artist and writer; his own brushwork was not remarkable, but his critical writings are valuable, and include *Del Cenacolo di Leonardo da Vinci*, *Delle opinioni di Leonardo*, etc.; he was sec. of the Milan Academy, and an

intimate friend of Canova.

BOSS RULE, Amer. term for a corrupt system of national and munic. politics, formerly very prevalent, in which party leader or boss organizes and manipulates elections by every kind of dubious means, and rewards his subordinates.

BOSSUET, JACQUES BÉNIGNE (1627-1704), Fr. theologian and orator, ordained 1652; came to Paris, 1659, and became famous as a preacher, especially for his *Oraisons funebres* (funeral sermons); tutor to the dauphin, s. of Louis XIV., 1670. B. was a man of keen intellect, but entirely opposed to disorder and anarchy, and therefore a firm believer in absolutism in Church and State, which he defended in his *Discours sur l'histoire universelle*. He applauded, therefore, the Revocation of the Edict of Nantes. But he defended the liberties of the Fr. Church against the Papacy in the *Defensio Cleri Gallicani*. He became involved in a bitter controversy with Fénelon. B. is one of the greatest figures of the monarchy of Louis XIV.

BOSTON, cap., Massachusetts, seventh city and fifth seapt. of U.S. (42° 22' N., 71° 5' W.), on Boston Harbor, at mouth of Charles and Mystic rivers. Boston is a great railway center; number of lines of steamers ply regularly to foreign ports; has excellent harbor accommodation and a good system of street railways and subways. Imports include wool and woolens, chemicals, iron and steel manufactures, wood, leather, fruit, fish, paper stock; exports provisions, live cattle, bread-stuffs, cottons, leather goods, wood, iron and steel manufactures, spirits.

Older part of town noted for narrow, irregular streets; newer part regularly laid out; main thoroughfare, Washington Street. Most famous buildings are public library, second largest in America, old State House, and Faneuil Hall, where resistance against Britain was first declaimed by revolutionary orators. In northern suburb of Charlestown is Bunker Hill Monument, commemorating famous battle in War of Independence. There are beautiful parks, including Franklin Park, and many churches, including R.C. cathedral. Educational institutes include Boston Univ., R.C. Coll., medical school of Harvard Univ., fine art school, and music conservatory; and there are many schools, including over 300 primary schools. Boston was for long the center of culture in America, and many great literary men, such as Longfellow, Lowell, Emerson, Whittier, have been associated with it; birthplace of Benjamin Franklin and Poe.

History.—Boston has developed from a settlement made in 1630 by members of the Massachusetts Bay Company, led by John Winthrop. Most of early settlers were Puritans and came from Lincolnshire. First called Trimountaine, name was afterwards changed to Boston. It was chosen as capital in 1632, and soon became principal seaport in America. In 1765 the Stamp Act was bitterly opposed here, and the 'Boston tea party' (1773), when 350 chests of tea were thrown into the harbor, was a prelude of the American Revolution. Boston played an important part in the Revolution and abolition of slavery. Pop. 1920, 748,060; with metropolitan area, 1,700,000.

BOSTON (53° 4' N., 0° 1' W.), seaport, Lincolnshire, England; fine parish church with decorated chapel; tower called Boston Stump; important fisheries; exports coal. Pop. 1921, 16,100.

BOSTON, Fr. card game, popular in America during the latter part of the XVIII. cent. It is said to have been first played at Boston, Mass., and had certain similarities to both whist and quadrille.

BOSTON MASSACRE, the name given to a clash between a mob and British soldiers in Boston, on March 5, 1770. Some time before this date the British Commissioners of Customs had ordered the seizure of the colonial trading sloop 'Liberty,' whose skipper had been found guilty of smuggling. So enraged were the citizens that the commissioners were at the time obliged to seek refuge aboard a British warship in Boston harbor. Ill temper continued among the people, which finally resulted in a free fight between some workmen and British soldiers, on March 3. In the evening of March 5 some boys began taunting the sentry in front of the Customs House, who struck one of the boys with the butt of his musket. The boy promptly fled but presently returned, followed by a mob, at the head of which was a half-breed mulatto, Crispus Attucks. A corporal's guard came to the relief of the sentry, but the mob became more and more violent. Col. Thos. Preston, a British officer, tried to calm the mob, without effect. Finally, in desperation, and apparently on their own responsibility, the soldiers fired into the mob, killing Attucks and two others, and mortally wounding two more. To pacify the people, the Governor ordered Col. Preston and the soldiers to trial, the colonel being defended by John Adams and Josiah Quincy. He and six of the soldiers were acquitted, but two were found

guilty of manslaughter and were branded in the hands and dishonorably discharged from the army.

BOSTON MOUNTAINS, a range of mountains in Western Arkansas extending into Oklahoma. The highest summit is 3,000 feet above the sea.

BOSTON TEA PARTY, an incident in Colonial history, resulting from the dispute between the colonies and the mother country over the payment of duties without proper representation in Parliament. In November, and early in December, 1773, three ships arrived in Boston harbor with consignments of tea. A public meeting of Boston citizens was held to protest against the landing of this tea. The captains of the ships professed themselves willing to return to England without landing the tea, but the Colonial Governor refused to clear the ships without landing all their cargoes. The meeting, presided over by Samuel Adams, on December 16, ordered the skipper of the ships to make a personal appeal to the Governor for clearance papers. In the evening they appeared before the meeting, which had again convened and reported that the Governor had definitely refused. At a signal, said to have been given by Adams, a number of young men, disguised as Indians, marched down to the dock, boarded the ships and hurled the tea overboard, amounting to 342 chests, valued at \$90,000. The result was that no more tea was shipped to the colonies from England.

BOSTON UNIVERSITY, Boston, Mass., founded in 1869, under a charter from the Commonwealth of Massachusetts. Its many departments comprise a College of Liberal Arts, a College of Business Administration, a School of Theology, a School of Law, a School of Medicine and a Graduate School. The University bestows the usual academic and professional degrees, but differs from most institutions in not conferring honorary degrees. The institution is co-educational in all its departments. In 1923 the enrollment of students was 8,104 and the members of the faculty numbered 362.

BOSWELL, JAMES (1740-95), Scot. author; s. of Alexander B. of Auchinleck, who subsequently became judge of the Supreme Court, and assumed the title of Lord Auchinleck; ed. at the High School and Univ. of Edinburgh; called to the Eng. and Scot. Bar, and practiced with little success as an advocate. He m. his cousin, Margaret Montgomery, and, after succeeding to his f.'s

estate, was enabled to live in independence. In character he was weak, foolish, vain, incontinent, and addicted to drunkenness. Yet for all his folly he possessed a distinct genius for hunting down celebrities, and had, as Goldsmith said, 'the faculty of sticking.' As the biographer of Samuel Johnson, he produced a work which is unique in its kind, and is indisputably one of the masterpieces of Eng. lit. His first meeting with Dr. Johnson took place in 1763, at Davies' bookshop in London, when the great lexicographer was fifty-four, and B. twenty-three. Thereafter they met frequently. 'Bozzy' was elected a member of the Literary Club; and traveled with Johnson in Scotland, the result being the *Journal of a Tour in the Hebrides* (pub. 1786). His magnum opus, *The Life of Samuel Johnson, LL.D.*, was first published in 1791, and met with instantaneous success. During his earlier continental travels he became acquainted with Pascal di Paoli, the Corsican chief, and pub. his *Account of Corsica*, in 1763.

BOSWORTH FIELD (52° 37' N.; 1° 25' W.), in Leicestershire, England; where Henry Tudor defeated Richard III., 1485.

BOT FLIES (*Oestridae*), large, strong flies, the larvae of which bore in the flesh chiefly of domesticated animals. *Gastrophilus* larvae attach themselves to the stomach of horses; *Hypoderma* larvae bore beneath the skin of cattle, forming 'warbles'; and *Oestrus* larvae are laid alive by the adults in the nostrils of sheep, where they commence to bore.

BOTANIC GARDENS. Purely scientific gardens are first found in XVI. cent. when univ's and private scholars began to study bot. for its own sake and various Ital. cities set up b. g's. The royal garden established in Paris, 1597, developed into *Jardin des Plantes*. B. g's were instituted at Oxford (1632), Chelsea (1677), Edinburgh (1670), Kew B.G. (1760).

BOTANICAL SOCIETY OF AMERICA, a national society of leading American botanists formed in 1893 as an outgrowth of the Botanical Club of the American Association for the Advancement of Science. Later it became enlarged by the inclusion of the Society of Plant Morphology and Physiology and the American Mycological Society.

BOTANY, the branch of Biology which deals with plants. It is divided into the following sections: (1) Morphology, treating of the external form of plants and their internal construction—the last-named study being also called

Histology or Microscopic Anatomy; (2) Physiology, dealing with the life processes of the plant as a whole, the functions of its various organs, and the method of its growth and development; (3) Systematic Botany or Classification, the principles upon which plants are classified. Two systems of classifications are distinguished: (a) The Artificial or Linnean (1735; now obsolete) based on character and arrangement of one set of organs (stamens and pistil); (b) Natural System, De Jussieu (1789), De Candolle (1813), Lindley (1845), based on natural relationship and grouping together species, genera, and orders most resembling each other in the sum-total of characters. The most generally adopted modern system groups plants as follows:—

Division I. Cryptogams—Flowerless plants; class 1, Thallophytes (Bacteria, Algae, Fungi), class 2, Bryophytes (Mosses, Liverworts), class 3, Pteridophytes (Ferns, Horsetails).

Division II. Phanerogams—Flowering plants; class 1, Gymnosperms (Cicads, Conifers), class 2, Angiosperms (Grasses, Herbs, Shrubs, Trees); subclass *a*, Monocotyledons (seed with 1 root-leaf—Palms), *b*, Dicotyledons (seed with 2 root-leaves). (4) Geographical Botany, investigating the natural distribution of plants and the causes influencing it. (5) Palaeontological Botany, the study of the forms of plants found as fossils in the various geological strata.

BOTANY BAY (34° S., 151° 13' E.), inlet, New South Wales, Australia; discovered by Cook, 1770. England's first penal settlement in the East was established here in 1787, but moved to Port Jackson the following year. The name, however, continued to be applied popularly to the Australian convict settlements generally. Though remarkable for its variety of plants (to this it owes its name), the soil is sandy and unsuitable for cultivation.

BOTHA, LOUIS (1863-1919), first prime minister of Union of S. Africa (1910), born at Greytown, Natal. He was a member of the first Volksraad of the Transvaal; succeeded General Joubert as commander of the Transvaal Boers during S. African War (1899-1902), in which he greatly distinguished himself; premier of Transvaal (1907-10). Created hon. general of the Brit. army (1912), he warmly espoused the Brit. cause in the World War, subdued S. African rebellion (1914), and commanded the Union forces in S.W. Africa, receiving the surrender of the Germans (July 9, 1915). He represented S. Africa at the Paris Peace Conference (1919).

BOTHMER, FELIX, GRAF VON (1852), Bavarian general, commanded composite Prussian army corps on Carpathian front, which advanced to the line of the Strypa (1915), where it held its ground during the Russian summer offensive (1916), but was outflanked and compelled to retire in July, and again in July, 1917, before the revolutionary armies, which it finally drove back to the Russian frontier.

BOTHNIA, GULF OF (62° N., 20° E.), northern arm of Baltic Sea.

BOTHWELL (55° 49' N., 4° 4' W.); town, on Clyde, Lanarkshire; ruins of B. castle; Covenanters defeated at B. Brig. 1679. Pop. of parish, 50,000.

BOTHWELL, JAMES HEPBURN, 4TH EARL OF (c. 1536-78), Lord High Admiral of Scotland (1556); P.C. (1561); became one of chief advisers of Mary Queen of Scots, and obtained complete ascendancy over her. After Darnley's murder (Feb. 9, 1567) B. became more powerful than ever; cr. Duke of Orkney and Shetland, and *m.* Mary, according to Prot. usage (May, 1567). The lords revolted; B. was driven into exile and Mary forced to abdicate. B. was divorced from Mary (Sept., 1570), and after her downfall, imprisoned in Zealand (June 16, 1673) till his death.

BOTTA, CARLO GUISEPPE GUGLIELMO (1766-1837), Piedmontese hist. writer; became naturalized Fr. citizen; rector of Rouen Univ. (1817); pub. (1824) *History of Italy*, from 1789-1814.

BOTTESINI, GIOVANNI (1823-89), Ital. composer and conductor; was a celebrated double-bass player; enjoyed European reputation as a conductor; composed numerous operas, including *Christoforo Colombo* (1847); *L'Assedio di Firenze* (1856); *Marion Delorme* (1862), etc.

BOTTICELLI, SANDRO (1444-1510), Ital. artist of the Florentine school; his real name was Alessandro di Mariano di Vanni del Filipepi; *b.* Florence; *s.* of a tanner; received his nickname 'Botticelli' (Little Cask), from the small barrel which hung outside his bro. Giovanni's door as a sign of his trade. Apprenticed at fifteen to a goldsmith, he early developed artistic ambitions and entered the studio of Fra Filippo Lippi (1460), under whom he spent several years, afterwards working with the brothers Pollaiuolo, during which time he won considerable fame amongst the art-lovers of Florence. His famous picture, *The Adoration*, now in the National Gallery, was painted whilst the young artist was still with Fra Lippo Lippi.

BOTTLE

Amongst his most famous pictures are *The Adoration*, already named, *Spring*, *The Birth of Venus*, *Mars and Venus*, *Pallas and the Centaur*, *The Nativity*, and numerous Madonnas.

BOTTLE, a vessel, now usually of glass or earthenware, for the storing of liquid. The ancients commonly used b.'s made of skins of goats or other animals; the 'leather bottle' was a common object of daily use down to the end of the XVII. cent., and skin bottles are still extensively used in parts of Asia.

The use of glass bottles has led to the invention of numerous machines for bottling, the simplest being contrived on the siphon principle, and the bottles are corked and labelled by machinery.

BOTTLE-FISH (*Saccopharynx ampullaceus*), has sac-like distensible body; preys on other fish.

BOTTLE GOURD (*Lagenaria*, from Lat. *lagena*, bottle), Indian annual flowering plant; fruit of enormous size; has hard rind which, when dried, holds liquids and is often named Calabash.

BOTTOMRY, in maritime law, is money payable to the owner of a ship, or his agent, for the use of the said ship, which depends upon its safe arrival at port. If the ship is cast away the lender loses his money, but if she reaches her port of destination safely he receives back his loan, together with interest. B. contracts must always be in writing, setting forth full particulars regarding the rate of interest and other details of the transaction, and, unlike mortgages, their priority ranks in inverse order to their dates—(i.e.) if there are several such bonds running, the latest executed has the first claim to satisfaction.

BOTZARIS, MARCO (d. 1823), Gk. leader in War of Independence.

BOTZEN, BOZEN, BOLZANO (46° 30' N., 11° 20' E.), trading town, Austrian Tyrol; silk. Pop. 15,000.

BOUCHES-DU-RHÔNE (43° 35' N., 5° E.), department, S.E. France, in Rhône delta, formerly part of Province (q.v.); contains three arrondissements—Marseilles, Aix, Arles; hilly in E.; large tracts stony country (Crau), swamp (Étang de Berre), and prairie (Camargue); olives, mulberries, vines, and fruits; horse and cattle-rearing. Area, 2,025 sq. miles. Pop. 805,500.

BOUCICAULT, DION (1822-90), Irish dramatist and actor; played with Macready and Webster, and was regarded as best stage Irishman of his time. His plays, which met with immense popular success, and are still

BOUILLON CUBES

played, include *London Assurance*, *The Colleen Bawn*, *Arrah-na-Pogue*, and *The Shaughraun*.

BOUDINOT, ELIAS (1740-1821), Amer. politician, soldier, and author.

BOUGAINVILLE, largest of Solomon Islands, Pacific Ocean (6° S., 155° E.); timber; taken from Germans by Australians (Jan. 1, 1915). Area, 3,000 sq. m.

BOUGAINVILLE, LOUIS ANTOINE DE (1729-1811), Fr. navigator; entered army (1753), becoming a colonel (1756); accomplished first Fr. circumnavigation of world (1766-69); made *chef d'escadre* (1779); field-marshal in army (1780); vice-admiral (1791); and subsequently became a senator and Count of the Empire.

BOUGH, SAMUEL (1822-78), Eng. landscape painter, noted for original, delicate coloring.

BOUGHTON, GEORGE HENRY (1833-1905), Anglo-Amer. painter; illustrated *The Scarlet Letter*, *Rip Van Winkle*; collaborated with E.A. Abbey in *Sketching Rambles in Holland*; wrote short stories of considerable merit.

BOUGIE (36° 44' N., 5° 4' E.), fortified seaport, on bay of B., Algeria; at one time greatest commercial center N. African coast, and capital of Berber kingdom, Beni-Hammad; captured by French, 1833; oils, wax. Pop. 10,500.

BOUGUEREAU, ADOLPHE WILLIAM (1825-1905), Fr. artist; was a versatile painter in many styles, but chiefly known for somewhat heavy treatment of classical subjects and the nude.

BOUHOURS, DOMINIQUE (1628-1702), Fr. author and Jesuit; wrote *Vie de Saint Ignace de Loyola* (1679); *Vie de Saint Francois [Xavier]* (1682), trans. New Testament into French, and produced several other devotional and secular books.

BOULHET, LOUIS HYACINTHE (1822-69), Fr. dramatist; his plays achieved considerable success, and include *Madame de Montarcy*, *Helene Peyron*, and the *Conjuration d'Amboise*.

BOUILLE, FRANCOIS CLAUDE AMOUR, MARQUIS DE (1739-1800), Fr. general; attempted to rescue Louis XVI., 1791; wrote *Memoires*.

BOUILLON (49° 48' N., 5° 5' E.), town, Belgium; remains of Godfrey of B.'s castle; was seat of dukedom from X. cent. Pop. 2,721.

BOUILLON CUBES. See **BREY EXTRACT**.

BOULANGER, GEORGE ERNEST JEAN MARIE (1837-91), Fr. general and statesman; director of infantry at War Office (1882); became War Minister (1886-87), and created the 'Boulangist' democratic agitation which threw France into confusion; he himself fought a duel with Floquet, the premier, in 1888; general (1887); returned for Paris (1889), but, accused of monarchical intrigues soon after, he lost courage and fled; committed suicide at Brussels (Sept. 30).

BOULAY DE LA MEURTHE, ANTOINE JACQUES CLAUDE JOSEPH, COMTE (1761-1840), Fr. author and politician. His elder son, Comte Henri Georges Boulay de la Meurthe (1797-1858), a Bonapartist, vice-pres. of republic (1849); advocate of popular education.

BOULDER, a city of Colorado, the County seat of Boulder co. It is on the Union Pacific and other railroads and on Boulder Creek, 29 miles northwest of Denver. It is in a famous and productive gold, silver and coal region and has also important agricultural and stock raising interests. It is the seat of the State University and has banks and daily and weekly papers. The famous Boulder canyon is an object of interest for tourists. Pop. 1920, 10,989.

BOULDER CLAY occurs in Brit. Isles, Norway, Sweden, Denmark, Central and N. Russia; shows traces of glacial action; belongs to Post-Tertiary or Quaternary period.

BOULÉ (compare Spartan *Gerusia* or *Gerousia*), advisory council of ancient Greece; such a council, probably composed of leading nobles, existed in Homeric state. The original Athenian b. (later the 'Areopagus') was superseded by Solonian b. of 400 members, 100 from each Ionic tribe; this in turn gave place to Cleisthenes' council of 500, fifty from each of ten artificially created tribes. The members were app. by the demes, and proportional representation was aimed at; they were paid one drachma per day (later 5 obols). The b. was an administrative and judicial body, a part of the legislative machinery, and had to prepare all business to be brought before the Ecclesia. After establishment of Gk. independence in XIX. cent. a b. of 235 senators was appointed under a system of manhood suffrage for four years; there is no Lower House.

BOULEVARDS (Fr. b., from Ger. *bollwerk*, bulwark), promenades in Fr. towns on sites of old fortifications; hence any avenues in a town.

BOULGER, DEMETRIUS CHARLES

(1853), Eng. author, established *Asiatic Quarterly Review*, 1885, jointly with Sir Lepel Griffin; authority on Asiatic and Belgian problems.

BOULLE, ANDRÉ CHARLES (1642-1732), Fr. cabinet-maker; patronized by Louis XIV. and the nobility, and had lodgings in the Louvre. He was one of the greatest artists in his craft that France has produced. Authenticated examples of his work are much sought after, and fetch high prices. The Wallace Collection, London, contains several specimens.

BOULOGNE-SUR-MER, seapt., Pas-de-Calais, France (50° 43' N., 1° 37' E.), 130 m. N.N.W. of Paris, and connected with Folkestone by daily cross-Channel service; divided into Haute-Ville and Basse-Ville; former surrounded by ramparts; most conspicuous building is cathedral (1827-66); harbor, recently enlarged, is great port for herring and cod fishing. Early in the Great War Boulogne acquired importance, and on Sunday, Aug. 9, 1914, the first of the transports conveying the Brit. Expeditionary Force arrived in the harbor. The calvary encamped at Ostrohoë, above the famous Villa Joséphine, and the infantry at Camp Malbrouck, round the Colonne de la Grande Armée, where in 1802 Napoleon had mustered an army for the invasion of England. When the Allied forces failed to stem the German sweep through Northern France, Boulogne was for a short time given up as port of communication with England. Being unfortified, it was proclaimed an 'open town'; but the Germans never reached it, and when the fighting settled down to trench warfare, Boulogne became the chief base of supply for the Brit. forces. Indeed, it became almost entirely British, and was fitted out with hospitals, depots, repair works, and the organization of supplies now necessary to a great army in the field. The port was several times attacked by German aircraft. Pop. 53,000.

BOULOGNE-SUR-SEINE (48° 50' N., 2° 14' E.), suburb of Paris, with famous pleasure-ground, 'Bois de B.' Pop. 35,000.

BOUNDARY, that which marks the limit, or extent, of any area, or territory; in matters relating to land, a boundary is generally marked by a road, ditch, stream, wall, or hedge.

BOUND BROOK, a borough of New Jersey, in Somerset co. It is on the Baltimore and Ohio, the Central of New Jersey, and other railroads, and on the Raritan River, and the Delaware and Raritan Canal. It is an important

industrial city and has manufactures of woollen goods, engines, paint and lumbering. Its public buildings include a hospital and a library. Pop. 1920, 5,906.

BOUNTY, in the commercial sense, money paid by the government to a new industry, the amount in proportion to production, to assist its growth and to protect it from foreign competition. In the United States the word subsidy is preferred, bounty referring specially to money paid to soldiers and sailors to enlist in army or navy. The payment of bounties was a practice in England two hundred years ago. During the American Revolution the British Government offered a bounty of £10 to any colonial who enlisted. To meet this situation the Continental soldiers had also to be offered bounties, which varied in amount, some of the states paying their recruits more than others. Washington impressed on the Continental Congress the necessity of increasing these amounts, and in 1780 recruits were offered \$200 at enlistment. It was during the Civil War that the U.S. Government paid the highest bounties. Toward the end of the war period recruits sometimes received, from the Federal Government and their state government together, as high as \$1,500. Over \$300,000,000 was paid in bounties during the Civil War. Bounties are still paid in the U.S. Naval Service, in time of peace, to encourage re-enlistments, the amount varying with the rating of the man re-enlisting.

BOUNTY ISLANDS (47° 40' S., 179° E.), rocky islands, E. of New Zealand; uninhabited.

BOUNTY JUMPER, a term describing those who, during the Civil War, accepted a bounty for enlisting, then deserted, after having collected the bounty paid by the Government. These bounties were paid during the later years of the war, when enlistments had become few and conscription could no longer reach many able bodied men. The amounts differed, from fifty to several hundreds of dollars. In comparison to the number of offenses committed few culprits were captured and punished. One man, on trial for this offense in 1865, confessed to having jumped his bounty 32 times.

BOURBAKI, CHARLES DENIS SAUTER (1816-97), Fr. soldier; joined the army, becoming a zouave (1836); lieut. of the Foreign Legion (1838), and aide-de-camp to Louis Philippe; distinguished himself in Crimean, Ital., and Franco-Ger. wars, and subsequently

app. military gov. at Lyons.

BOURBON, Fr. family, figuring in history from IX. cent. In 1272, a younger s. of Louis IX. of France obtained the lordship of B. in Berry by marriage with the heiress; his s. Louis was cr. Duke of B. in 1327; the Constable of B. (b. 1490) obtained fame in imperial service and was slain during sack of Rome (1527). In the person of Henry IV. the B's ascended the throne of France (1589), and the War of the Span. Succession (*q.v.*) resulted in establishment of B's on throne of Spain; for long Span. and Fr. 'Family Compacts' threatened balance of power.

The B's fell in France, 1791, and were expelled from their various Span. and Ital. possessions by Napoleon; restored 1815; younger Orleanist branch replaced elder in France, 1830-48, when they were expelled; driven from Naples (1860) Spain (1868-74). The elder branch d. out with the Comte de Chambord, 1883, and the Orleanists again became sole hope of the Fr. monarchists; present representative, Louis Philippe, Duke of Orleans. Prince Charles of Bourbon represents younger branch of family.

BOURCHIER, ARTHUR (1864), Eng. actor-manager, adapter, and translator of plays; *m.* Violet Vanbrugh, 1894.

BOURCHIER, THOMAS (d. 1486), Eng. ecclesiastic; abb. of Canterbury (1454), Lord Chancellor (1455), cardinal (1467). He crowned Edward IV., Richard III., and Henry VII., famous as preacher at court of Louis XIV.; man of beautiful character and great oratorical power; much revered by all classes.

BOURG-EN-BRESSE (46° 12' N., 5° 13' E.), town, Ain (in old province of Bresse), France; famous church, Notre Dame de Brou, founded by Margaret of Austria, XVI. cent. Pop. 20,000.

BOURGEOIS, LÉON VICTOR AUGUSTE (1851), Fr. statesman and eminent writer; is a veteran leader of Radical party, who has held office in eight cabinets; minister of Interior (1890); of education and fine arts (1892); of justice (1892-3); prime minister (1895-6); minister of labor and social reform (1912-13); of labor (1917); president of Senate (1920); retired 1922. An accomplished orator, he would probably have become president of Republic but for his feeble health; is author of an epoch-making book, *La Soldatie*. He was appointed to represent France on Council of League of Nations (Oct. 1919).

BOURGEOISIE (*i.e.* bourgeois class), Fr. middle class, divided into *petite* and *haute b.*; forms the Philistia of Bohemians.

BOURGES (47° 4' N., 2° 24' E.), city, on Canal du Berry, Cher, France; ancient *Avaricum*, capital of Aquitania; seat of abb.; cathedral of St. Étienne, one of greatest in France; large arsenal; gunpowder, ammunition; Council here asserted freedom of Gallican Church, 1438, by Pragmatic Sanction; Charles VII.'s capital. Pop. 50,000.

BOURGET, LE (45° 39' N., 5° 49' E.), town, Savoie, France; Prussians defeated French, 1870.

BOURGET, PAUL CHARLES JOSEPH (1852), Fr. novelist and critic, member of Fr. Academy; has produced a considerable number of novels in various styles, which have made his reputation as a master of psychological analysis, and are distinguished by an exquisite sense of form and expression. Many of these have been translated into English—(e.g.), *Un Crime d'Amour*, *Mensonges*, *Drames de Famille*, *Un Divorce*, etc. He also occupies a high position as a critic—(e.g.), *Etudes et Portraits*; while his descriptive powers are shown in *Sensations d'Italie*.

BOURMONT, LOUIS AUGUSTE VICTOR, COMTE DE GHAINSE DE (1773–1846), Fr. general; served with army of *émigrés* (1792–93), subsequently became a general in imperial army; went over to enemy at beginning of Waterloo campaign; war minister (1829); commanded Algiers expedition (1830); and retired to Portugal on Revolution of 1830.

BOURNE, EDWARD GAYLORD (1860–1908), American educator and historian; born Strykersville, N.Y. He graduated from Yale in 1883 and became professor of history in that institution, 1905. He wrote extensively on critical and historical subjects, and his work is marked by keen acumen and profound analysis. Among his works may be cited *Spain in America* (1904); *Life of J. L. Motley* (1905) and *Discovery, History and Conquest of the Philippine Islands* (1907). His critical essay on *The Legend of Marcus Whitman* is a model of its kind and is regarded as definitely settling the Whitman question.

BOURNE, FRANCIS (1861), R.C. abb. of Westminster since 1903; cardinal. 1911.

BOURNE, HUGH (1772–1852), founder of Eng. religious sect of Primitive Methodists (1811) from Wesleyan Methodist Connexion.

BOURNE, JONATHAN (1855), American legislator; born New Bedford, Mass. He studied at Harvard, but left before graduation to go to sea, where

he narrowly escaped death in a shipwreck. Returning to Oregon, he practised law, became identified with many mining and commercial organizations and engaged actively in politics. He became a member of the Oregon legislature as a Republican 1885–86 and 1897 and in the latter year was elected to the United States Senate. He failed of renomination for a second term. He was a member of the Post Office Committee and was a prominent factor in the inauguration of the parcel post service.

BOURNE, RANDOLPH SILLIMAN (1886–1919), American political and philosophical writer. He wielded a brilliant pen and was connected at various times with the *New Republic*, *Seven Arts* and *The Dial*. He was a leader among the younger school of writers, especially of the intransigent and radical wing. His death at the age of 33 cut short a career full of promise.

BOURNE, VINCENT (1695–1747), Eng. Latin poet; was a master at Westminster school; famous for the exquisite grace of his Latin poems, which have received high praise from Cowper, Lamb, and others.

BOURNEMOUTH (50° 43' N., 1° 53' W.), watering-place, on Eng. Channel, Hampshire, England. Pop. 1921, 91,770.

BOURNONITE (CuPb,SbS), mineral, sulphide of antimony, lead, and copper, steel-grey metallic lustre, found in Cornwall, Harz Mountains, Mexico: used as lead ore.

BOURRIENNE, LOUIS ANTOINE FAUVELET DE (1769–1834), Fr. diplomatist; ed. military school of Brienne with Napoleon; subsequently studied law and diplomacy at Vienna and Leipzig; private sec. to Napoleon (1798), Fr. envoy to Hamburg (1805–10).

BOURRIT, MARC THEODORE (1739–1819), Swiss author and mountaineer; was the first climber to essay the ascent of Mont Blanc, in which he failed, but made other famous ascents. He pub. several descriptive works on Swiss mountain-climbing.

BOURSAULT, EDMÉ (1638–1701), Fr. dramatist; his plays are now forgotten, but he obtained considerable notoriety by reason of his bickerings with Molière and Boileau, both of whom had ridiculed him.

BOURSE, continental Stock Exchange.

BOUSSU (50° 26' N., 3° 47' E.), town,

Belgium; coal, iron, copper. Pop. 12,000.

BOUTERWEK, FREIDRICH (1766-1828), Ger. philosopher; prof. of Philosophy at Göttingen; at first was a follower of Kant, but later favored the views of F.H.Jacobi.

BOUTHILLIER, CLAUDE, SIEUR DE FOUILLETOURLE (1518-1652), Fr. diplomatist and statesman; sec. of State (1628); superintendent of finances (1632-43).

BOUTWELL, GEORGE SEWELL (1818-1905), American statesman; born Brookline, Mass. He was admitted to the bar in 1836. He entered politics as a Democrat, was seven times elected to the Massachusetts legislature and in 1851 became Governor, being re-elected the following year. The repeal of the Missouri Compromise caused him to shift his party allegiance and assist in organizing the Republican party. In 1863 he was chosen to Congress and was twice re-elected. He was one of the managers of the impeachment trial of President Johnson. From 1869 to 1873 he was Secretary of the Treasury and in the latter year entered the Senate, where he served until 1879. He was an able lawyer as well as an experienced statesman and in 1877 was appointed by President Hayes to prepare a codification of the statutes at large. Following the Spanish-American war, he was a vigorous opponent of what he considered the imperialistic policy of the Administration, especially with reference to the Philippines. Among his publications are *The Constitution of the United States at the End of the First Century* (1896); *The Crisis of the Republic* (1900); and *Reminiscences of Sixty Years in Public Affairs* (1902).

BOUVET, FRANÇOIS JOSEPH (1753-1832), Fr. admiral; served in Fr. navy, becoming captain and rear-admiral (1793); dismissed for failure to land General Hoche in Ireland (Dec. 1796); restored to service by Napoleon.

BOUVIER, JOHN (1787-1851), Amer. judge and legal writer.

BOUVINES (50° 34' N., 3° 12' W.), village, Nord, France; Philip Augustus o' France defeated Otto IV. of Germany, 1214

BOVIANUM.—(1) (41° 29' N., 14° 25' E.), ancient city of Samnium, Italy; modern Boiano. (2) (41° 43' N., 14° 22' E.) ancient city, 5 miles S. of Agnone, Italy.

BOVIDÆ, family of hollow-horned ruminants now distributed throughout the world but formerly not occurring in

Central and S. America and Australia. It includes sheep, goats, cattle, antelopes, gazelles, etc.

BOW, anything curved or bowed; formerly it was used for arch, whence is derived Bow Church; weapon used to shoot arrows (see ARCHERY). Violins and similar instruments are played with b's, consisting of a stick of Pernambuco wood, about 29 in. in length, strung with white horsehair. The best kind of b. in use at the present time, with its various parts and accessories, was the invention of François Tourte (1747-1835). A primitive kind of b. was in use from very early times.

BOWDICH, THOMAS EDWARD (1790-1824), Eng. author; spent some years on the Gold Coast, during which time he went on a mission to the king of Ashanti; pub. an account of his adventures under the title of *Mission from Cape Coast Castle to Ashantee* (1819).

BOWDITCH, HENRY PICKERING (1840), American educator; born Boston, Mass. He graduated from Harvard in 1861 and later studied chemistry and medicine. He served in the Civil War, reaching the rank of major, and following the conflict, pursued special studies in physiology in France and Germany. In 1876 he was made professor of physiology at Harvard Medical School, which chair he held for thirty years, resigning in 1906. He is a member of the American Academy of Arts and Sciences and has written extensively on physiological subjects. His publications include *The Growth of Children* (1877); *Is Harvard a University?* (1890); and *Hints for Teachers of Physiology* (1899).

BOWDITCH, NATHANIEL (1733-1838), Amer. sailor and scientist; wrote valuable book on navigation.

BOWDLER, THOMAS (1754-1825), Eng. editor and philanthropist; was an M.D. of private fortune, who became notorious as the editor of *The Family Shakespeare* (1818), in ten vol's, in which all words and expressions were omitted which might offend the prudish sense. From his name is derived the phrase, to *bowdlerise*, and though he has been execrated by many, his work has been praised by Swinburne.

BOWDOIN, JAMES (1728-90); Amer. patriot in War of Independence. His s. James Bowdoin (1752-1811), was politician and diplomatist. Bowdoin College (q.v.) is named for him.

BOWDOIN COLLEGE, in Brunswick, Me., an institution devoted to education in the liberal arts and sciences. It was

given its charter in 1794, from the legislature of Massachusetts, Brunswick being at that time included in that state, and it was named from James Bowdoin, at that time governor of Massachusetts. It now ranks as one of the best colleges in the country, its yearly income being \$200,000 and its endowment, in 1922, amounting to \$2,683,367, its student enrollment then being 458 and its faculty numbering 37 at the end of the 1921-22 term. The library contains 125,000 volumes. In 1922 its Medical Department was discontinued.

BOWEN, FRANCIS (1811-90); Amer. educator; b. Charlestown, Mass.; ed. Harvard; edit. *North American Review* (1843-54); besides biographies of public men, he wrote *A Treatise on Logic*, 1864; *American Political Economy*, 1870; and numerous other works.

BOWEN, HERBERT WOLCOTT (1856), American diplomat; b. Brooklyn, N. Y. He was educated at Yale and Columbia Law School. President Harrison appointed him United States consul at Barcelona, Spain, in 1890, and in 1894 under Cleveland he was made consul-general of the same city. When the Spanish-American war broke out he was forced to leave his post, and in 1901 was made Minister Plenipotentiary to Persia by President McKinley. He was later appointed Minister to Venezuela but resigned in 1906. Among his publications are *Verses*, *Losing Ground*, *In Divers Tones*, and *International Law*.

BOWER BIRD, name given to several species of Australian sub-family Ptilonorhynchinae, a division of family which includes bird of paradise; receive their name from their habit of constructing bowers, runs, huts, etc., which they ornament with bright-colored flowers, rags, shells, etc., with an apparent sense of color and design seemingly far beyond powers of instinct.

BOWFINS (*Amiidae*); only living representative, the bowfin or grindie, *Amia calva*, a mottled green ganoid fish approaching the Herring family in characters, found in the fresh waters of the eastern U.S.A.; an excellent sporting fish, but seldom used as food. Fossil species occur from Eocene onwards.

BOWIE-KNIFE, hunting weapon named from its inventor, Col. James Bowie (c. 1790-1836); double blade about 12 in. long, curved.

BOWLES, FRANCIS TIFFANY (1858), American naval constructor; b. Springfield, Mass. He graduated from the U.S. Naval Academy in 1879. Following post-graduate studies at the

Naval College, Greenwich, England, he became a member of the U.S. naval advisory board in 1882. Since that time he has been a notable factor in the work of naval construction and played an especially prominent part in the rehabilitation of the American navy. For many years he had charge of construction at the Norfolk and Brooklyn navy yards. In 1901 he was appointed chief constructor of the navy with the rank of rear admiral. Two years later he resigned to become president of the Fore River Shipbuilding Co.

BOWLES, SAMUEL (1826-79), American journalist; b. Springfield, Mass. For more than thirty years he edited the Springfield Republican, which had been established by his father. His fearless and able policy made him a power in New England journalism and indeed throughout the United States. He had strong convictions and a pungent way of expressing them that made him a friend to be desired and an enemy to be feared. In the slavery controversies he stood with the Whigs and afterward with the Republicans. He fostered the Liberal Republican movement and advocated the election of Greeley. Later the paper became and remained independent. He was among the first to urge the granting of suffrage to the negro and was an ardent friend of woman suffrage. He traveled widely over the country and the result of his observations were embodied in a volume, *Our New West*, which he published in 1869.

BOWLES, WILLIAM LISLE (1762-1850), Eng. poet and antiquary; canon, Salisbury Cathedral; pub. *Fourteen Sonnets on Picturesque Spots* (1789), which greatly influenced Coleridge and Wordsworth, and prepared the way for the revolt against pseudo-classical school of poetry of the XVIII. cent.

BOWLING. See **BOWLS**.

BOWLING GREEN, a city of Kentucky, in Warren co., of which it is the county seat. It is at the height of navigation of Baren River, and is an important commercial city. Its industries include the manufacture of tobacco and carriages. It is one of the largest horse markets in the United States. Pop. 1920, 9,638.

BOWLING GREEN, a city of Ohio, in Wood co., of which it is the county seat. It is on several important railroads. In the neighborhood are important oil wells. Its industries include the manufacture of cut glass, etc. Pop. 1920, 25,788.

BOWLS, with the exception of archery, the oldest surviving Eng. game. It was played as early as the XIII. cent.; the first mention of the game by the name of 'bowls' occurs in acts of Henry VIII.'s time; and during the Elizabethan age 'bowling alleys' were to be found throughout the country. Henry VIII. enjoyed a game; Sir Francis Drake was playing at bowls when the news reached him of the coming of the Armada; the Stewart kings were followers of the game, Charles I. especially, who is said to have beguiled with it his captivity at Homby and Carlsbrooke. The Puritans regarded the pastime with no friendly eye, but, with the Restoration, it again came into favor, since which time it has continued to flourish, and was never more popular than it is at the present day.

BOWERING, SIR JOHN (1792-1872), Eng. linguist (100 languages); first edit. of Westminster Review, and gov. of Hong-Kong; ordered much criticized bombardment of Canton (1856).

BOX (*Buxus sempervirens*), the common box tree, belongs to the order *Euphorbiaceae*, is a native of S. Europe. In warm countries it reaches a considerable height. The wood is hard, close, and heavy, of a pale yellow color, and much used in the manufacture of flutes and similar musical instruments. A dwarf variety is used for garden borders.

BOXALL, SIR WILLIAM (1800-79), Eng. hist. and portrait painter; director of National Gallery, London (1865-74).

BOXERS, members of Chin. militant religious soc.; led anti-Christian movement, 1899-1902. See CHINA (History).

BOXING, the art of fighting with the fists, now generally with the hands protected by padded gloves. Although the anc. Greeks and Romans had boxing contests with strict rules regarding them, the development of modern boxing, which has been almost entirely confined to England, the Brit. colonies, and U.S., dates from the beginning of the XVIII. cent., becoming a popular and fashionable sport about 1735-50, when Jack Broughton, the inventor of boxing-gloves, flourished. The Augustan age of boxing was during the first two decades of the XIX. cent.—the times of Mendoza, Belcher, 'Gentleman' Jackson, Gully, Tom Cribb, Dutch Sam, and Tom Spring.

A revival took place about 1850-60, when Heenan, King, Tom Sayers, and Jem Mace were in the ring. The public outcry after the great fight between Heenan and Sayers caused prize fighting

to be declared illegal in England. In 1866 the Amateur Athletic Club was founded, and the rules on which the modern sport is based were drawn up mainly by the 8th Marquess of Queensberry. Since 1890 considerable public interest has been taken in professional contests, Peter Johnson, the negro, Sharkey, Pedlar Palmer, John L. Sullivan, Kid McCoy, Dick Burge, Bob Fitzsimmons, Jim Corbett, James J. Jeffries, Tommy Burns, Jack Johnson the negro, Jack Dempsey, Jesse Willard, Georges Carpentier, Joe Beckett, and Bombardier Wells all being well known names.

The World War, while preventing some big meetings, in no way retarded the popularity of the sport. In America the revival of the boom saw the meeting of Dempsey and Willard in July, 1919, and of Carpentier and Beckett in London in December of the same year, followed in 1921, by the defeat of Carpentier by Dempsey, which gave the latter the championship of the world.

BOXING DAY. In England, day (not Sunday) after Christmas, when 'box' or present, is given to servants, etc.

BOYACA, BOJACA (5° 25' N.; 73° 40' W.), town and department of Colombia, S. America; has richest emerald mine in world; capital, Tunja; area, 16,460 sq. miles. Pop. (department) 657,157.

BOYAR (Russ. *bogarin*, lord), name of members of privileged rank of old Russ. aristocracy next in dignity to princes; abolished by Peter the Great.

BOYCE, WILLIAM (1710-79), Eng. composer; s. of a cabinet-maker; became master of the king's band, and organist of the Chapel Royal; celebrated for his church services and anthems, e.g. *By the Waters of Babylon*; pub. a valuable work on *Cathedral Music* (3 vol's).

BOYCOTTING, system adopted under the 'Land League' in Ireland to prevent any person from taking or working a farm or building from which a tenant had been evicted for the non-payment of rent. Laborers were forbidden to work for the 'land-grabber,' tradesmen refused to deal with him, and in many cases cattle were maimed, crops destroyed, and personal assaults committed. The first victim was Captain Boycott (1832-97), agent for Lord Erne, with whom the Connemara inhabitants refused to have any dealings, because of the evictions for which he was responsible. His life was threatened, his property damaged, and he experienced many troubles.

BOYDEN, ROLAND WILLIAM lawyer and diplomat; b. Beverly, Mass. He graduated in 1885 from Harvard from which institution he received the degree of LL.B. (1888). In the latter year he was admitted to the bar. In 1921 he was appointed by President Harding as American Observer on the Reparations Commission. In that capacity he transmitted many important reports to the U.S. State Department. While his functions were supposed to be confined to the observation merely and he had no vote in the matter of reparations, he created something of a sensation in Jan., 1923, on the eve of the French advance into the Ruhr, by making a speech before the Commission condemning some features of the Treaty of Versailles and advocating a more lenient policy toward the German Government.

BOY-ED, CAPTAIN KARL (1873), notorious Ger. agent; was closely associated with Admiral von Tirpitz, and did much to support his naval policy. On outbreak of war was appointed naval attaché at Washington, and abused his position by acting as chief of Ger. secret service in U.S.; was identified with plans for procuring bogus passports for Ger. reservists, for releasing interned liners, for invasion of Canada, and for blowing up munition factories, etc. His nefarious activities made the U.S. demand his recall (Dec. 1915). He was afterwards decorated by the Kaiser.

BOYER, ALEXIS (1757-1833), Fr. surgeon; surgeon to Napoleon I., whom he accompanied on his campaigns, and to the succeeding sovereigns of France; prof. of Operative and later of Clinical Surgery, École de Santé; surgeon-in-chief (1825), Hôpital de la Charité.

BOYER, JEAN PIERRE (1776-1850), native Pres. of republic of Haiti, 1818-43.

BOYSEN, HJALMAR HJORTH (1848-95), literary historian and critic; was successively prof. of German at Cornell Univ. and Columbia Univ. New York; did good work in interpretation of Ger. and Scandinavian literature to Eng.-speaking peoples; author of *Goethe and Schiller*, commentary of the *Works of Ibsen*, etc.

BOYLE, RICHARD (1566-1643), English statesman, known as 'The Great Earl of Cork'; b. at Canterbury, England. He was educated at Cambridge, and at the age of 22 went to Ireland, where he purchased great landed properties and rapidly acquired a position of power and influence. He was active in suppressing a rebellion in Munster, and in recognition of his service James I.

created him privy councillor for that province and later for all Ireland. In 1616 he was made a peer of that realm with the title of Baron Boyle and in 1620 became Viscount Dungarven and Earl of Cork. He was a staunch adherent of the English Crown, to which he did not hesitate to subordinate the interests of the people under his control. A flagrant instance of this was the deportation of the inhabitants of the fertile province of Limerick to the dreary bogs of Kerry, supplying their places with English colonists. He attained a high degree of contemporary eminence, as is shown by the above mentioned sobriquet by which he was designated. Despite his ruthlessness, he largely benefited Ireland by the introduction and fostering of useful arts and manufactures.

BOYLE, ROBERT (1627-91), Eng. natural philosopher; 7th s. of Richard B., Earl of Cork; ed. Eton, and afterwards traveled extensively abroad; studied natural sciences, particularly physics, and made important inventions and researches in pneumatics (*Boyle's law*); also studied theology. B. was a founder of Royal Soc., an East India Co. director, and instituted 'Boyle Lectures' for defence of Christian religion. Works include *Seraphic Love*, *Hydrostatical Paradoxes*, *Experiments touching Colours*. Of feeble constitution, gracious and kindly nature.

BOYNE (53° 43' N., 6° 16' W.), river, Ireland; rises in Bog of Allen, enters Irish Sea; scene of battle, July 1, 1690, in which William III. defeated James II.

BOY SCOUTS, an organization of boys in the United States and England which has for its purpose the development of character and manly qualities in young boys. According to some authorities the idea was first conceived by Lieut.-Gen. Sir Robert S. S. Baden-Powell, on observing the efficiency of a system of despatch carrying boys in South Africa during the Boer War. However, he did not put the idea into effect in England until 1908, when, according to other authorities, it was suggested to him by the example of Ernest Seton-Thompson's 'Woodcraft Indians,' an organization of boys which the latter had founded in the United States as far back as 1900, for the purpose of enabling city boys to obtain the healthy influence of country development and to encourage nature study. At about the same time Dan Beard, the American illustrator, had also formed a similar organization, 'The Sons of Daniel Boone.' These two organizations were merged into the Boy Scouts

of America, in 1910, and incorporated under the laws of the District of Columbia. In that same year the British Boy Scouts were established under a royal charter. The object of the organization in this country, where it is less military in character than in England, is to bring city boys into rugged, natural environment during their holidays, to teach them self reliance and otherwise to influence them in the direction of good morals. Only boys over the age of twelve may join. Eight boys form a 'patrol'; four patrols constitute a 'troop.' Each troop is under the leadership of an adult, a 'scoutmaster.' The organization as a whole is governed by a National Council. At the beginning of 1922 there were 611 local councils, 416 of which were rated 'first class,' meaning that they supported paid executives. The country is divided into 12 regional scout districts, each including several states. On joining, a boy takes an oath, in which he declares that 'on my honor I will do my best; to do my duty to God and my country, and to obey the scout laws; to help other people at all times; to keep myself physically strong, mentally awake and morally straight.' He also promises to be 'trustworthy, loyal, helpful, friendly, courteous, kind, obedient, cheerful, thrifty, brave, clean and reverent.' He must also 'do one good turn daily.' The motto of the organization is 'be prepared.' On joining a boy is rated as a 'tenderfoot,' but by meritorious conduct he becomes a second class scout. He may rise in standing and compete for a badge of reward by qualifying in any one or several of 67 specialties, which range from woodcraft to music or aviation. There is a National Court of Honor which awards medals for proficiency in these specialties and for bravery in saving life. In 1921 three gold, 64 silver and 80 bronze medals were awarded. These medals lift a boy to the rank of Life, Star or Eagle, and entitle him to life membership in the organization. The national headquarters of the organization are in New York city, where the official organ, 'Boy's Life,' and an organ for adult scoutmasters and officials, 'Scouting,' are published. In the beginning of 1922 there were 403,156 boy members and 12,043 scout leaders.

BOZEMAN, a city of Montana, the county seat of Gallatin co. It is on the Northern Pacific, the Chicago, Milwaukee and St. Paul, and on the Gallatin River. It is the center of an important mining region and in the neighborhood are large deposits of coal and stone. It is also important as an agricultural and

stock raising center. Its industries include flour mills, lumber mills, and foundries. Bozeman is the seat of the State College of Agricultural and Mechanical Arts. There is a public library and county and municipal buildings. Pop. 1920, 6,183.

BOZRAH.—(1) (32° 31' N., 36° 33' E.), ancient city, Bashan, Syria; ruins of cathedral, mosque, Rom. triumphal arch, and theatre. (2) town, Edom, S.E. Dead Sea.

BOZZARIS, MARCOS (1788-1823); Gk. hero of War of Independence; fell in sortie from Missolonghi.

BRA (44° 42' N., 7° 52' E.), town, N. Italy. Pop. c. 16,000.

BRABANÇONNE, LA, Belg. song of freedom; composed 1830.

BRABANT, mediæval duchy of Low Countries, corresponding to modern province of North or Dutch B. (q.v.) and the Belg. provinces of South B. (q.v.)—inhabitants mostly Walloons—and Antwerp (inhabitants chiefly Flemings); separated from Lorraine, XI. cent.; Limberg attached, 1288; united to Burgundy, 1430; became part of Span. monarchy, 1516; afterwards formed part of kingdom of Holland; since 1830, three provinces as above.

BRABANT, NORTH (51° 32' N., 5° E.), province, southern Holland; area, 1,980 sq. miles; surface flat; heathy and marshy tracts; agriculture and cattle-rearing; inhabitants mostly R.C.; chief town, Hertogenbosch. Pop. 732,035.

BRABANT, SOUTH (50° 45' N., 4° 30' E.), province of Belgium, between Meuse and Scheldt; area, 1,267 sq. miles; industrial and agricultural; thickly populated; capital, Brussels (q.v.). Pop. 1,587,259.

BRACCIOLINI, FRANCESCO (1566-1645), Ital. poet; wrote poetry in various forms, but is chiefly noted for his mock-epic, *Lo Scherno delgi Dei*, and his narrative poem, *La Croce Racquistata*.

BRACE, CHARLES LORING (1826-90), American author and philanthropist; b. Litchfield, Conn. He graduated at Yale in 1846 and later studied theology, though he never entered the ministry. He devoted his life chiefly to poor children and wrote and labored unceasingly for their benefit. He traveled widely in Europe, studying the school systems of various countries, and on his return became secretary of the New York Children's Aid Society. He did beneficent work among the newsboys of the metropolis. His publications include *Hungary In 1851* (1852); *The*

Norse Folk (1857); *Short Sermons To Newsboys* (1861); *The Dangerous Classes of New York and Twenty Years' Work Among Them* (1872); *Gesta Christ* (1883), and *To the Unknown God* (1889).

BRACEGIRDLE, ANNE (d. 1748), Eng. actress; acted with Betterton; chiefly remembered in connection with Congreve's comedies.

BRACELET, article of adornment, worn on the arms (in earlier times by men as well as women), and dating back to prehistoric times. The earliest kinds were either spirals, in the form of snakes, or artistically finished hoops, with highly decorated terminals. In later times bracelets with chased and jeweled panels came into favor.

BRACHIOPODA, class of invertebrate marine animals with bivalve shells, ranging in size between a quarter of an inch to 4 inches, while certain species (e.g. *Productus giganteus*) attain a length and breadth of almost 1 foot. They are of great interest and importance, partly owing to the great number of species (over 4000), most of which are fossil and form valuable indications of the age of the strata to which they belong, and partly due to the uncertainty of their systematic position in the animal world. It has been variously held that the b. show affinities with the Mollusca, Annelida, and Tunicata, but they may be regarded as allied to the Polyzoa, offshoots from the heterogeneous group called 'worms.'

BRACKETT, FRANK PARKHURST (1865), American mathematician and astronomer; b. Provincetown, Mass. He graduated at Dartmouth College in 1887, and three years later became professor of mathematics and astronomy at Pomona College, Claremont, Cal. He has traveled extensively for scientific purposes, having been a member of the Smithsonian Astronomical Expedition to Africa, 1911, and to Mount Whitney, 1915. He made important contributions to meteorology and has written a number of mathematical treatises.

BRACKLEY, THOMAS EGERTON, VISCOUNT (c. 1540-1617), judge and Chancellor of England; Solicitor-General (1581); took part in trial of Mary, Queen of Scots; Attorney-General (1529); knighted (1593); Master of the Rolls (1594); a P.O. and Keeper of the Great Seal (1596). He became a trusted adviser and diplomatic agent of Elizabeth, and a staunch friend of Essex; reappointed Lord Keeper and cr. Baron Ellesmere and Lord Chancellor (1603); cr. Viscount B. (1616), he retired (1617).

BRADDOCK, a borough of Pennsylvania, in Allegheny co. It is on the Pennsylvania, the Baltimore and Ohio, and other railroads, and on the Monongahela River. The city is a very important industrial community and has manufactures of steel, pig iron, steel rails, etc. It has the first Carnegie library established in America, a hospital, Federal buildings, and a park. The town is on the site of Braddock's Defeat in 1755. Pop. 1920, 20,879.

BRADDOCK, EDWARD (d. 1755), Brit. general; commanded the forces operating against the French on the Ohio; taken in an ambush during attempt, with Washington, to capture Fort Duquesne. Nearly half his troops fell, and B. received mortal wound.

BRADDON, MARY ELIZABETH (1837-1915), Eng. novelist; dau. of a Cornish solicitor; her first novel was *The Trail of the Serpent* (1861); her first popular success, *Lady Audley's Secret* (1862); since which time she has pub. many novels, which have appealed to a very wide public. She m. the publisher, John Maxwell, and her s., W. B. Maxwell, is well known as a writer of fiction.

BRADFORD (53° 48' N., 1° 45' W.); city, municipal county and part of W. Riding, Yorkshire, England; principal seat of woollens and worsteds manufacture; important wool market; silks, velvets also made; first mill built, 1798; now over 300; St. Peter's Church dates 1485; handsome public buildings; fine parks and statues; good railway communication; connected with Humber and Liverpool by canal; near coal, iron mines, stone quarries; engineering. Pop. 1921, 285,979.

BRADFORD, a city of Pennsylvania, in McKean co. It is on several railroads and is 15 miles N.W. of Smethport, the county seat. It is the center of an important coal, iron and natural gas region and its industries are chiefly relating to these products. In addition there are manufactures of brick and tile. The city has banks, a hospital and libraries. Pop. 1920, 15,525.

BRADFORD, JOHN (d. 1555); Eng. Prot. martyr; b. Manchester; studied law, but subsequently turned to divinity, and became a fellow of Pembroke Hall, Cambridge, was made chaplain to Edward VI. and the bp. of London (Ridley), and became popular preacher. During Mary's reign B. was committed to the Tower, tried for heresy, and burnt at Smithfield.

BRADFORD, WILLIAM (1590-1657); Amer. colonial gov.; b. Husterfield.

BRADFORD-ON-AVON

Yorkshire; joined the Separatists; sailed in *Mayflower* (1620); elected gov. of Plymouth colony (1621).

BRADFORD-ON-AVON (51° 21' N., 2° 16' W.), market town, Wiltshire, England; church of Holy Trinity contains curious tombs, ancient brasses; Saxon church, St. Lawrence, built by St. Aldhelm (q.v.), VIII. cent., only perfect example of its kind in England; formerly important manufactures of broadcloth; quarrying and iron-founding. Pop. 5,000.

BRADING (50° 31' N., 1° 9' W.), town, Isle of Wight, England; Rom. remains. Pop. 15,000.

BRADLAUGH, CHARLES (1833-91), Eng. politician (advanced Radical); b. Hoxton, London, in humble circumstances; gradually won reputation as a free-thought lecturer; conducted *National Reformer* for many years; allied himself with Mrs. Annie Besant.

BRADLEY, JAMES (1693-1762), Eng. astronomer, discoverer of 'Aberration of Light' (q.v.); Savilian prof. of Astron., Oxford (1721); lecturer on experimental philosophy (1729); Astronomer-Royal (1742).

BRADLEY, WILLIAM O'CONNELL (1847-1914), American lawyer and legislator; born near Lancaster, Ky. He began the practice of law in 1865, was a presidential elector in 1872, and in 1880 sprang into national prominence because of his speech seconding the nomination of Grant for President. In 1904 he made a still more eloquent speech seconding the nomination of Roosevelt for the Presidency. In the national Republican Convention of 1888 he received 105 votes for the Vice Presidential nomination. He was Governor of Kentucky from 1895 to 1899 and was elected United States Senator for the term 1909-15, dying however before his term expired. For many years he was a prominent and influential figure in Republican councils.

BRADSHAW, GEORGE (1801-53), Eng. printer and publisher; b. Pendleton, Manchester; pub. wellknown *Bradshaw's Railway Time-Tables*, 1839 onwards.

BRADSHAW, HENRY (d. 1513), Eng. poet; was a monk of St. Werbergh's Abbey, Chester, and wrote a legendary epic dealing with the patron saint of his abbey, which has been edit. for the Chetham Society (1848) and the Early Eng. Text Society (1887).

BRADSHAW, HENRY (1831-86), Eng. scholar and librarian; fellow of King's Coll., Cambridge; dean (1857-65); Univ. librarian (1867); made a

BRAHAM

special study of Celtic and other MSS. in the library.

BRADSHAW, JOHN (1602-59), Eng. judge; called to Bar (1627), becoming a bencher (1647); presided over 'High Court of Justice' which tried Charles I.; pres. of Council of State (1649); Commissioner of Great Seal (1659). B. was a zealous republican; his body was disinterred at Restoration and gibbeted.

BRADWARDINE, THOMAS (1290-1348), abp. of Canterbury; chaplain to Edward III.; present at *Crecy* and taking of Calais; called 'Doctor Profundus' from his anti-Pelagian work, *De Causa Dei*.

BRADY, CYRUS TOWNSEND (1861-1920), an American writer and clergyman, b. at Allegheny, Pa. After spending some years in railroad service he became a clergyman of the Protestant Episcopal Church and held several pastorates. In 1914 he was rector of St. Stephens Church, New York City. In 1899 he began the writing of novels and stories and became one of the most widely read fiction writers of his time. Many of his books dealt with historic subjects.

BRADY, NICHOLAS (1659-1726), Irish divine; wrote, with Tate, metrical version of *Psalms*.

BRAGA (41° 35' N., 8° 21' W.), city, N. Portugal; abp.'s seat; Gothic cathedral; Rom. ruins; firearms. Pop. 25,000.

BRAGA, THEOPHILO (1843), Port. statesman and author; provisional president of new republic (Oct. 1910-Aug. 1911); chief work, *Historia da Literatura Portuguesa* (20 vols. 1860-80).

BRAGANÇA, BRAGANZA (41° 50' N., 6° 46' W.), town, Portugal; capital of Traz-os Montes province; partly surrounded by walls; cathedral; silk; gave name to house of B.; 8th Duke of B. ascended throne, 1640, on liberation of Portugal. Pop. 5,000.

BRAGANÇA.—(1) (0° 55' S., 46° 55' W.) town, Brazil, S. America. Pop. c. 18,000. (2) (22° 48' S., 46° 32' W.) town, Brazil. Pop. c. 10,000.

BRAGG, BRAXTON (1817-76), Amer. Confederate general and engineer; his bro., Thomas Bragg (1810-72), was gov. of N. Carolina (1855-59), U.S.A. senator (1859-61), and attorney-general in Confederate Cabinet (Nov. 1861-March 1862).

BRAHAM, JOHN (1774-1856), Eng. vocalist; b. London, of Jewish parents; real name, Abraham; sang at Covent Garden as a youth; afterwards supported himself by pianoforte teaching. When

he recovered his voice (a tenor of remarkable richness and purity), he at once leapt into public favor, and, for upwards of forty years, was in the front rank of operatic and concert singers. B. built the St. James' Theatre (1836), and was a composer of some ability, his *Death of Nelson* being still popular.

BRAHE, TYCHO (1546-1601), astron.; b. Kulstrup, Sweden; discovered star *Cassiopeia* whilst resident in Germany (1572); director of Observatory of Uraniborg (1576-97); from 1599 worked at Prague in conjunction with Kepler; chief work, *Astronomiæ instauratæ Mechanica*.

BRAHMANISM, name given to the pre-Buddhist religion of India. A body of sacred writings called *Veda* is preserved. There are four collections of these writings, and *Brahmanas*, a kind of commentary on them (dating from VII. cent. B.C.). The type of religion shown in them is that of the great forces of nature, which seem to be personified. By degrees a pantheistic stage was reached. But Indian religion must always be viewed in relation to Indian history, and it must never be forgotten that an invasion of India by white-skinned Aryan race took place in early times, and the darker and more primitive peoples were subdued. In the Vedic hymns (which represent the primitive Aryan society) there is a military and noble and also a priestly class, both superior to the common people. In the fully developed b. we see a rigid caste system of four classes; the *Brahmana*, or priestly class; the *Vishatriya*, or warriors; the *Vaisya*, or tradesfolk; and the *Sudra*, or serfs.

The first three of these represent the Aryan, the last the older inhabitants. The first three classes, though rigidly marked off the one from the other, were the 'twice-born.' The Sudras were purely servile. There could be a certain amount of intermarriage. A man could marry beneath him if he had already a wife of his own rank. A devout Brahman was supposed to pass through four stages of religious life: he was to be first a student, then a householder, then a recluse, then a beggar. The third stage was only to be entered on late in life, when he retired into the woods alone, living on wild herbs and accepting charity only when obliged. Gradually theistic besides pantheistic tendencies developed, and a conception of 'brahma' as a personal god appeared. Older forms of devotion were grafted in; thus *Brahma*, Vishnu, and Siva came to represent the creative, preservative, and destructive aspects of the world. Siva took the place of another Vedic god as

the representative of reproduction. Each of these three had a female partner. A reformation was carried out by Gotama (VI. cent. B.C.), the Buddha, who, while he maintained caste, abolished the sacrificial and sacerdotal system.

BRAHMAPUTRA (24° N., 89° 45' E.), river, Asia, rising probably in Lake Manasowar, on tableland N. of Himalayas in W. Tibet, close to head-waters of Sutlej and Indus; has course eastward of c. 1,000 miles, then turns S.E., crosses Himalayas, and passes through Assam to join Ganges; supposed great falls not yet discovered (1913). Length, c. 1,800 miles (navigable about 800 miles). B. means 'Son of Brahma.'

BRAHMS, JOHANNES (1833-97), Ger. composer; b. Hamburg; an austere classicist, it has only been since his death that B. has taken a foremost place among composers. He wrote symphonies, concertos, Hungarian dances, songs, and practically every musical form but the dramatic, all marked by skilful technique and greatness of rhythm, but he attains highest point in his *Lieder* and choral works, among which are well-known *Schicksalslied*, *Rinaldo*, *Triumphlied*; see *Life*, by Erb (1905), and *Brahms*, by Stanford (1912).

BRAILA (45° 17' N., 27° 55' E.), river port, on Danube, Rumania; ruined fortress; extensive docks; belonged to Turks XVI. to XVIII. cent.; taken by Russians, 1770 and 1828; free port till 1883; grain. Pop. 65,000.

BRAILLE, LOUIS, see BLIND.

BRAILSFORD, HENRY NOEL (1873) English author and journalist; born at Mirfield, Yorks. He graduated at Glasgow University with philosophical and classical honors. In 1895 he was lecturer at Queen Margaret College. He was leader-writer successively on the Manchester Guardian, Tribune, Daily News and Nation. In 1897 he enlisted in the Greek foreign legion and a year later became British Relief Agent in Macedonia. He was a member of the Carnegie International Commission in the Balkans, 1913. His publications include: *Broom of the War-God* (1906); *War of Steel and Gold* (1914); *A League of Nations* (1917); *Across the Blockade* (1919); *After the Peace* (1920) and *Russian Workers' Republic* (1921).

BRAIN, that part of the central nervous system contained in the skull: consists of the *cerebrum*, divided into two hemispheres, the great mass of the b. which dominates the working of the other parts; the *mid-brain*, a short stalk connecting the cerebrum with the hind-

brain, which comprises the *pons Varolii*, bridging over the lower part of the stalk; the *cerebellum*, a large bi-lobular mass below and behind the cerebrum; and the *medulla oblongata*, the bulbous continuation of the spinal cord in the skull, below the cerebellum. The b. is enveloped by three membranes—the *dura mater*, the *archnoid mater*, and the *pia mater*. The *dura mater* is the most external, closely applied to the interior of the cranial bones, and strong extensions of it dip down into the b., the *falx cerebri*, a deep sickle-shaped partition, dividing the two hemispheres of the cerebrum, the *tentorium cerebelli* forming a floor between the cerebrum and cerebellum, and the *falx cerebelli* separating the halves of the cerebellum behind. The *dura mater* also forms channels, *venous blood sinuses*, for conveying the venous blood away from the b. The *arachnoid mater* is a delicate membrane loosely covering the b. and separated from it by the *pia mater*, which closely covers the outer surface, dipping down into the furrows between the convolutions on the surface of the b.

BRAIN, WEIGHT OF THE.—The average weight (which has no bearing upon the intelligence) of the human male b. is between 48 and 49 oz., the female b. being lighter, but only in proportion to the lighter weight of the female body.

BRAINERD, a city of Minnesota, the county seat of Crow Wing co. It is on the Northern Pacific and other railroads, and on the Mississippi River. The city has important industrial interests including machine shops of the Northern Pacific railroad. It has also lumber yards, cigar factories, flour mills, paper works, etc. Its public buildings include a courthouse, Y.M.C.A. buildings, a library and St. Joseph's Hospital. There is a large trade in lumber, grain, furs and iron. Pop. 1920, 9,591.

BRAINERD, DAVID (1718–47), Amer. missionary to N. Amer. Indians; *Journal* much read.

BRAINERD, ELEANOR HOYT (1868), American author; born Iowa City, Ia. She married Charles Chisholm Brainerd of New York, June 1904. For some years she taught in the Cincinnati Wesleyan College and Gardner School for Girls, New York. Among her publications are: *The Misdemeanors of Nancy* (1902); *Nancy's Country Christmas and Other Stories* (1904); *Concerning Belinda* (1905); *In Vanity Fair* (1907); *For Love of Mary Ellen* (1912) and *How Could You, Jean?* (1917). She has written a number of stories for magazines.

BRAINTREE, a town in Massachusetts, in Norfolk co. It is on the New York, New Haven and Hartford Railroad, 10 miles south of Boston. Included in it are the villages of South and East Braintree, and the town is connected with the principal nearby towns and villages by electric railways. Its most important industry is quarrying of granite. There are also manufactures of shoes, wool, rubber goods, etc. John Adams and John Quincy Adams and other members of this family were born in this town. Pop. 1920, 10,580.

BRAISTED, WILLIAM CLARENCE (1864), American naval officer and surgeon; born Toledo, Ohio. He graduated from the University of Michigan, 1883, and from the Medical Department of Columbia University, 1886. He practised medicine in New York and in Detroit 1886–90; entered the Navy as Assistant Surgeon in 1890; was made Medical Inspector 1913. He represented the Medical Department in Japan during the Russo-Japanese War, and as Assistant Chief of the U.S. Bureau of Medicine and Surgery assisted in the reorganization of same, 1906–1912. In Feb. 1914 he became Surgeon General with rank of Rear Admiral. He received many decorations from foreign Governments.

BRAKE, instrument to check the velocity of moving body, or to bring it to rest, by increasing the resistance to its motion. Two of the simplest forms of b. action are the pressing of a metal shoe against the rim of a moving wheel, and the tightening of a strap on a revolving drum. On slow-moving road-vehicles the wheels may be prevented from rotating by fixing skids beneath them, or by passing through the spokes a chain fastened to the vehicle. The resistance of fluids is sometimes used for braking purposes, as when revolving blades are checked by the resistance of the air or of some liquid in which they are arranged to work.

B's may be applied by muscular force acting through a lever or screw, as in the case of most road vehicles; but the power thus obtained is insufficient for many purposes, and the power-b. becomes necessary. Amongst the many different types of power-brakes may be mentioned *mechanical* b's, worked by springs or chains wound on drums; *hydraulic* b's, in which the power obtained by forcing water through pipes is transmitted by suitable mechanism to the brake-shoes; *electric* b's; *compressed air* and *vacuum* b's; and b's worked by steam or water from an engine boiler, operating through cylinders.

BRAKELOND, JOCELYN DE, Eng.

monk; wrote chronicle of monastery of Bury St. Edmunds, 1173-1202.

BRALEY, BERTON (1882), American author; born Madison, Wis. Graduated at the University of Wisconsin, 1905. Engaged in newspaper work with the Butte (Mont.) Inter-Mountain (1905-06) and was later with the Butte Evening News and Billings (Mont.) Gazette. He was associate editor of Puck in 1910 and has been a free lance writer since that date. From 1915-16 he served as a special correspondent in Northern Europe. He is a voluminous writer, having contributed about 5,000 poems and 300 short stories to newspapers and magazines. Among his publications are: *Oracle of Smoke* (1905); *Sonnets of a Suffragette* (1913); *Songs of a Workaday World* (1915); *Things as They Are* (1916); *In Camp and Trench* (1918); *Buddy Ballads* (1919), and *The Sheriff of Silver Bow* (1921).

BRAMAH, JOSEPH (1749-1814). Eng. mechanic; invented hydrostatic press, safety locks, etc.

BRAMANTE, DONATO (1444-1514), Ital. architect; was patronized by Popes Alexander VI. and Julius II.; joined the Belvedere Palace to the Vatican, and was commissioned to rebuild St. Peter's, which, begun in 1506, was completed after his death by Michelangelo and others.

BRAMBLE, see **BLACKBERRY**.

BRAMHALL, JOHN (1594-1663), abp. of Armagh (1660); as bp. of Derry carried Laud's Arminianism into Ulster; impeached with Strafford; called 'the Athanasius of Ireland.'

BRAMPTON, HENRY HAWKINS, BARON (1819-1907), Eng. judge; b. Hitchin; called to Bar (1843); raised to Bench (1876); retired, 1898.

BRAMWELL OF HEVER, BARON, GEORGE WILLIAM WILSHERE BRAMWELL (1808-92), Eng. judge; joint author of Common Law Procedure Act, 1852, abolishing special pleading, and Companies Act, 1862.

BRAN.—(1) mythical Celtic hero; (2) dog of Ossian's Fingal.

BRANCO, PARIMA (1° 20' S., 62° W.), river, N. Brazil, joins Rio Negro.

BRANDAN, ST., BRENDAN (d. 578), Irish Benedictine abbot of the monastery of Clonfert (Galway). The real B. became confused with a legendary hero who sailed to an island paradise in the neighborhood of the Canaries or the West Indies. The existence of 'St. Brandan's Isle' was long believed in by

geographers, and numerous expeditions were undertaken in search of it.

BRANDEGEE, FRANK BOSWORTH (1864), American legislator; born New London, Conn. He graduated at Yale, entered the profession of law, was elected to the Connecticut legislature in 1888 and in 1889 became its speaker. In 1902 he was elected to Congress to fill an unexpired term and was re-elected for two consecutive terms. He was elected United States Senator in 1905 and re-elected to the same office in 1909, 1915 and 1921. He took a prominent part in the debates on the ratification of the Versailles Treaty and voted for its rejection. In general he acted with the conservative element of the Republican party.

BRANDEIS, LOUIS DEMBITZ (1856), American jurist; born Louisville, Ky. He studied at the Annen Realschule, Dresden, Germany, and later at Harvard, where he received the degree of LL.B. in 1877. He was admitted to the Bar in 1878 and from 1879 to 1916 practised law in Boston, where he speedily rose to eminence in his profession and built up an extensive practice. His sympathies were strongly with the working classes, and in many important cases he served without fee to protect and advance their interests. He has fought consistently against privilege. In 1914 he was counsel for the people in proceedings involving the constitutionality of the women's ten-hour laws in Illinois and Oregon, the California eight-hour law and minimum wage law in Oregon. In questions involving subways, gas and insurance rates he has also been on the people's side as against corporate interests. He has acted as chairman of arbitration boards in strike troubles. In 1916 he was nominated as Associate Justice of the Supreme Court by President Wilson, and in the face of considerable opposition the appointment was confirmed by the Senate. He was the first man of Jewish race and creed to hold that position. He has been a prominent figure in the Zionist movement. He has written many articles on that subject, as well as on matters connected with public franchises, wage-earners' life insurance and the scientific management of labor problems.

BRANDENBURG, prov. of republic of Prussia, Germany (52° 30' N., 13° 45' E.); sandy plain ('sandbox of the Holy Roman Empire'), with fertile districts; fruit, flax, barley, rye, hemp, tobacco; iron, chalk, alum; cap. Berlin. Area, 15,376 sq. m.; pop. 4,092,600.

History.—Ger. margraviate and electorate, nucleus of later kingdom of

Prussia. Brennibor (later Brandenburg) was captured by Henry I. of Germany (923); mark of E. Saxony divided, northern portion becoming later margraviate of Brandenburg (965); Albert the Bear was made margrave of N. mark (1134), and on death of Duke of Brandenburg (1140) took title of Margrave of Brandenburg; a colonizer and civilizer; territory extended under the three Ottos (1130-67); ruled by imperial house of Wittelsbach directly or indirectly, 1323 onwards; Louis IV. granted margraviate to his son Louis (1323), who after a reign of anarchy enfeoffed his step-brothers, of whom Louis was recognized as one of seven electors by Golden Bull (1356). They bequeathed the remainder of the margraviate to Wenceslaus, son of Charles IV., who (1373-78) ruled in his name, restoring law and order, and causing Domesday survey to be made; Wenceslaus (1410) granted electoral vote to Frederick VI. of Hohenzollern, who was made governor (1411), and in 1415 purchased the electorate, margraviate, and office of chamberlain, ever since held by members of his house. Frederick I. (1415-40) put down nobles; Frederick II. (1440-71), called 'Iron,' reduced rebellious towns and purchased new mark of Brandenburg; Albert Achilles (1471-88) extended territory, and entailed (1472) margraviate and electorate; Joachim I. (1499-1535) restored law and order and encouraged trade; Joachim II. (1535-71) suppressed monasteries, established national Church, obtained (1569) half duchy of Prussia and remainder of other half; John George (1571-98), careful administrator, Lutheran; John Sigismund (1608-19) started claim to Cleves, Jülich, and Berg, and became (1618) Duke of Prussia; George William (1619-40) brought disaster on Brandenburg through slothful policy in Thirty Years' War; Frederick William, the 'Great Elector,' put down nobles, created a wonderful army, started a navy, expelled Swedes, extended territory, and became leader of Reformation; Frederick III. continued his father's policy, and in 1701 was crowned King of Prussia. For subsequent history, see PRUSSIA.

BRANDES, GEORG MORRIS COHEN (1842), Dan. literary critic; established European reputation by brilliant critical writings, including studies of Shakespeare, Ibsen, Anatole France; work of high merit is *Main Streams in Nineteenth Century Literature* (1886-1906); influence on Scandinavia profound; pub. 33 vols. in all; anti-Christian attitude. His *Samlæde Skrifter* appeared (1900-8); he has also written on *The World War, Voltaire and Caesar* (2 vols.).

BRANDING (O. Teut. *brinnan*, to

burn), legal punishment used in England chiefly for vagrants; abolished, except for deserting soldiers (1829), and in 1879 entirely. Method of scorching signs into animal's flesh for purposes of identification.

BRANDON (49° 50' N., 99° 58' W.), city, port of entry, Manitoba, Canada; agriculture; grist-mills, sawmills. Pop. 1921, 15,359.

BRANDY (Old Eng. *brandywine*; Ger. *Brannwein*, i.e. burnt wine), a spirituous liquor; average percentage of alcohol, 54; S.G. .93; prepared by distillation of wine; the best at *Cognac*; exported also from Spain and Canada. Pure b. is colorless; pale b. deriving its color from cask, brown b. from caramel; flavor and aroma due to various ethers; furfurol, cœnathic, butyric, and acetic; often made by adding these to alcohol and water.

BRANDYWINE (39° 43' N., 75° 37' W.), stream, Pennsylvania and Delaware; Lord Howe defeated Washington; Sept. 11, 1777.

BRANGWYN, FRANK (1867), Eng. painter and illustrator; born Bruges, Belgium. He studied art in London under the tutelage of William Morris, and later traveled extensively in the Orient. He has an original style, with a strong leaning toward gorgeousness in color. Both his etchings and paintings are noted for the sharpness of their contrasts. He is a member of the Royal Academy and has served as president of the Royal Society of British Artists. His more notable paintings include *The Baptism of Christ*, *Venetian Funeral*, *Buccaneers*, *Gold*, *Frankincense and Myrrh*, *Mars and Venus* and *The Convict Ship*. His best known etchings are *London Bridge*, *Old Houses*, *Ghent*, and *The Paper Mill*.

BRANT (*Branta bernicea*), species of wild duck found in Europe and America; breeds in Arctic regions.

BRANT, JOSEPH (1742-1807), Mohawk chief, friendly to England, which he visited in 1786. Published Book of *Common Prayer* and *Gospel of Mark* in Mohawk and English.

BRANTFORD, a city of Ontario, Canada, a port of entry of Brant co. It is on the Grand River and on the Grand Trunk and other railways, 70 miles east of London. The town is connected with Lake Erie by a canal. Its industries include the manufacture of metal, stoneware, machinery, agricultural implements, etc. It is also the center of a large agricultural community. Here is the Ontario Institution for the Education of the Blind. Pop. 30,000.

BRANTÔME (45° 25' N., 0° 37' E.), town, Dordogne, France; ruined abbey.

BRANTÔME, PIERRE DE BOURDEILLE, SEIGNEUR AND ABBÉ DE (c. 1540-1614), Fr. historian, soldier, and courtier. His *Memoires* give a valuable picture of profligacy of contemporary society.

BRAS D'OR (45° 50' N., 6° 50' W.), tideless gulf, Cape Breton Island; communicating with Atlantic by ship canal.

BRASIDAS, Spartan soldier and orator; came to forefront during Peloponnesian War; relieved Methone (431 B.C.); prevented Athenian attack on Megara; won over Acanthus, Stagirus, and other Athenian allies; routed Athenians before Amphipolis, but was himself killed in the battle (422).

BRASLAU, SOPHIE (1892), opera singer; born in New York of Russian parents. She was educated under private teachers and at any early age evinced unusual acting ability and the possession of a rich contralto voice. She has sung in the Metropolitan Opera Co., New York, and has made several concert tours, her itinerary embracing the leading American cities.

BRASS, alloy of copper and zinc (3 parts copper to 1 or 2 zinc), prepared by fusing the metals in clay crucibles; yellow, very tenacious, ductile, malleable, rendered harder by slight (2 to 4%) admixture of iron.

BRASSEY, THOMAS (1805-70), Eng. surveyor and railway contractor; constructed part of Grand Junction Railway (1835), and with a partner, railway from Paris to Rouen (1840); also constructed Canadian Grand Trunk Railway and railways in Italy, Spain, Holland, Prussia; employed enormous number of workers, and was a genius in his calling.

BRASSEY, THOMAS LORD (1836-1918), Eng. naval expert; gov. of Victoria (1895-1900); cr. baron, 1886.

BRATHWAITE, RICHARD (1588-1673), Eng. poet; author of *Barnabee's Journal* (1638), a humorous itinerary valuable for its topographical information; other works include *The Poet's Willow* (1614), *The Prodigal's Tears*.

BRATIANO. (1) Jon (1821-91), Rumanian statesman; leader in Rumanian revolt (1848); secured deposition of Cuza and called Prince Charles of Hohenzollern-Sigmaringen to throne; minister (1866-70, 1876-88). (2) Jon J. C. (1866), Rumanian statesman, s. of above; minister of public works (1892); secretary for foreign affairs

(1904); prime minister (1908-10), and again in 1914; pursued waiting policy, but brought Rumania into the World War (Aug. 27, 1916); one of three Rumanian delegates to Peace Conference.

BRATTLEBORO, a town in Vermont, in Windham co. It is on the Boston and Maine and the Central Vermont railroads, and on the Connecticut River. The town is the center of a farming region and is the chief trading point of southeastern Vermont. It is the seat of the State Asylum for the Insane and has a handsome public library. Its industries include the manufacture of organs, carriages, furniture and machinery. Battleboro is the most important center for the maple sugar industry of Vermont. Pop. 1920, 7,324.

BRAUNSBURG (54° 23' N., 19° 50' E.), town, on Passarge, Prussia. Pop. 15,000.

BRAY (51° 31' N., 0° 42' W.), village, Berkshire, England; Simon Aleyn, Vicar of B. (1540-88), retained living during reigns Henry VIII., Edward VI., Mary, and Elizabeth by changing principles; famous song assigns him to reigns Charles II. to George I.

BRAY, FRANK CHAPIN (1866), American editor and educator; b. Salineville, Ohio. He paid his way through Wesleyan University by working as a printer and reporter, graduating in 1890. In 1891 he became the city editor of the Middletown (Conn.) Herald; from 1892 to 1894 was managing editor of the Erie (Pa.) Morning Despatch. Later he served for six years on the staff of The Literary Digest and from 1899 until 1914 was editor of The Chautauquan. In 1906 he became editor manager of the Chautauqua Press, an organization which publishes the study courses of the Chautauqua Circle. He was editor of the League of Nations Magazine in 1919, and in 1920 joined the staff of the Literary Digest.

BRAZIL, republic, occupying nearly half the S. Amer. continent (5° 10' N., 33° 46' S., 34° 45'-73° 50' W.); extreme length, 2,660 m.; breadth, 2,700 m. Brazil is bounded N. by Venezuela, Brit., Dutch, and Fr. Guiana; N.E. by N. Atlantic, S.E. by S. Atlantic; S.W. by Uruguay, Argentina, Paraguay, Bolivia; W. by Peru, Ecuador, Colombia; N.W. occupied by basin of Amazon and tributaries; S.W. is in Paraguay basin; both these areas have large amount of unhealthy, low-lying, and swampy land; E. and S.E. occupied by great plateau, average elevation over 3,000 ft., and by higher tableland cut

by deep valleys, having appearance of series of mountain ranges, some reaching height of over 7,000 ft.; these, running parallel with Atlantic, render communication with interior very difficult; large part of country still unexplored. Chief mts. are Mar, Orgãos, Espinhaço, Mantiquiera, Geral, Vertentes, Pyreneos, Santa Martha, and Plauhy ranges in eastern coastal and central districts. Chief tributaries of Amazon are Japura, Rio Negro from N., Jurua, Purus, Madeira, Tapajos, Xingu from S. Tocantyns flows northward, entering sea near mouths of Amazon, and San Francisco R. cuts across eastern ranges, entering sea between Macelo and Aracaju; Paraguay, Taquary, and Parana drain S.; Madeira and rivers E. of it, and Parana and tributaries, flow through tableland and hills, and have many falls and rapids. Chief tns. are Rio Janeiro (cap.), Bahia, and Pernambuco. Climate varies greatly; mean temp. ranges between 63° and 79° F.; rainfall between 50 and 100 in.

Flora includes cabinet woods, rubber, palms, mimosa, bombax, lianas, grasses, ferns, cypresses, acacias, myrtles, coffee, cacao, tobacco, and many other valuable trees and plants. Fauna includes many kinds of birds and snakes, monkeys, deer, bats, opossums, jaguars, pumas, slots, armadillos, rodents, etc.

Resources.—Timber and other vegetation of great tropical forests along Amazon and elsewhere are most valuable, including caoutchouc, fibre plants, nuts, furniture, woods, dye woods, drug plants. Cultivated products include coffee, sugar-cane, tobacco, cotton, maté, rubber, cassava, cinchona, cocoa, vines. In S. inland provinces are raised great herds of cattle. Minerals are abundant but undeveloped, except gold; in S. are beds of coal, lignite, bituminous schist, peat; silver, lead, iron, copper, manganese, quicksilver also occur; diamonds are found in Minas Geraes, Bahia, Sao Paulo, Matto Grosso; other deposits are saltpetre, rock salt, mineral oil, china clay.

Brazil is largely agricultural, with only a small proportion cultivated at present, but there are some industries, including cotton spinning and weaving, woolen manufactures, silk weaving, flour mills, fruit preserving, distilling, brewing; imports food-stuffs, coal, coke, cottons, machinery, woollens, chemical products, metals, furniture, leather goods, books, etc.; exports coffee, rubber, tobacco, sugar, cocoa, maté, gold, hides, cotton. Railway mileage (in 1917, 17,159) is in process of extension; telegraphic communications are controlled by state, and a wireless system is being completed.

Inhabitants of Brazil include Italians, Portuguese, Spanish, Germans, English, Indians, Africans, half-breeds. Area, 3,275,510 sq. m.; pop. (est.), 27,470,000.

History.—Brazil has oldest civilization in western hemisphere; first sighted by Span. comrade of Columbus, named Pinzon, who explored mouths of Amazon in 1500; later in same year Port. navigator Cabral reached coast of Brazil, and took formal possession of country in name of King of Portugal. Portuguese established fort at Pernambuco (c. 1526), which soon afterwards was sacked both by French and by an Eng. adventurer, Hawkins. In 1530 first systematic attempt at settlement was made, João III. of Portugal sending Affonso de Sousa to divide country into 'capitanias,' or portions of land which were granted to such Port. subjects as undertook to develop them and subdue aborigines. Affonso was aided by Caramuru, whom he found already settled here, in founding town of Bahia. The result of capitanea system was that number of abuses crept in, Port. colonists ill-treating the natives and thus causing revolts and race hatreds; Port. government therefore sent Thomé de Sousa in 1549 to act as gov.-gen.; he was accompanied by 4,000 settlers and six Jesuits; latter had great share in developing civilization in Brazil; former intermarried with Indian women, thus creating Brazilian nation, which in about fifty years was practically a European race.

In 1578 governor had to swear allegiance to Philip II. of Spain, who had annexed Portugal in that year. From this time various attacks and invasions were made by French, Dutch, and English. Santos was twice sacked (1583-1591); Pernambuco taken by French and English (1595); Dutch repulsed from Bahia (1599, 1604); Bahia taken by Dutch (1621); compelled to withdraw (1625); but in 1629 they reduced great part of coast of Brazil, and established their government, of which Maurice of Nassau became president in 1637. With restoration of Port. independence in 1640, connection of Brazil with Spain ended. Dutch were compelled to leave country by Portuguese after many years of war, and in 1713 treaty was made with French, who also retired, English, French, and Dutch henceforth holding the Guianas, and leaving Brazil to Portuguese. Principal event of later 18th cent. was expulsion of Jesuits in 1760; their influence, at first beneficial, had declined, and many of them suffered ill-treatment when expelled. In 1763 Rio became seat of government. Following cent. saw great changes in history of Brazil. In 1807

Napoleon's invasion of Portugal resulted in flight of royal family to Brazil; the regent, Don João, was welcomed with enthusiasm. Great advances took place in civilization. The States use most of the revenues for their own benefit; while the federal government keeps up the army and navy, superintends the general administration of the states, and is charged with the direction of the home and foreign policy of the republic. There is no state religion; education is not obligatory. Military service is nominally compulsory. On Oct. 26, 1917, Brazil declared war upon Germany. See MAP SOUTH AMERICA (EAST PT.)

F BRAZIL, a city of Indiana, the county seat of Clair co. It is on the Central of Indiana and other railroads. Its chief industries are the mining of block coal but it also has manufactures of mining machines, pianos, sewer pipes, etc. In the neighborhood are large deposits of clay. The city has a public library and other public buildings. Pop. 1920, 9,293.

BRAZING AND SOLDERING, processes for uniting metallic surfaces by fusing between them other metallic substances called solders. In brazing (or hard soldering), *spelter*, a kind of brass, is employed, the surfaces being cleaned and heated, and fusion assisted by borax. In *soft soldering* (e.g., tin ware), fusion is effected by a heated copper wedge.

BRAZOS RIVER, one of the largest rivers in Texas. It begins at the junction of Clear and Salt forks, Young County, in the western part of the State, and flows in a tortuous course to the southeast between the Colorado and the Trinity for some 900 miles, emptying into the Gulf of Mexico between Quintana and Velasco, southwest of Galveston. It drains a fertile country generally containing many highly productive cotton plantations. A number of towns have grown on its banks, among them Waco, halfway from its mouth, an important railroad center. During high water it is navigable for 300 miles from the gulf and at all seasons to Columbia, 40 miles from its mouth.

BRAZZA (43° 19' N.; 16° 40' E.), largest of Dalmatian islands; olives, figs; area, 152 sq. miles. Pop. 25,000.

BRAZZA, PIERRE PAUL FRANCOIS CAMILLE SAVOIGNAN, COUNT DE (1852-1905), Fr. explorer and colonial commissioner; persuaded France to take part in Congo enterprise; put at head of Fr. Congo expedition, 1880-82; commissioner-general of Fr. Congo, 1886.

BREACH OF TRUST is failure to fulfil moral and sometimes legal obligation; b. of promise to marry is actionable as b. of contract; b. of the peace (i.e., the public peace), is actionable; b. of arrest, offence of military officer under arrest in going beyond bounds assigned him.

BREACHING TOWER, movable structure which gave protection to besiegers in Rom. and mediæval warfare; on wheels; several stories.

BREAD is baked dough, which is essentially a mixture of flour and water, with a little salt, generally 'aerated' and so 'raised' by means of carbon dioxide gas. *Unleavened* b. and biscuits are made without aeration. The aeration and raising of dough may be carried out with or without fermentation by yeast.

Fermentation Processes of bread-making are very old. Leaven is dough remaining from a previous batch. Yeast for bread-making may be brewers' or compressed yeast, from distilleries, or it may be cultivated by the baker; it should contain only the organism *Saccharomyces cerevisiae*. Dough must be thoroughly kneaded—often by special machinery—to distribute the yeast equally, and then kept at about 80° F. for some hours, while glucose, derived from the starch of the flour, is fermented to carbon dioxide and alcohol. The carbon dioxide aerates the dough, making it rise, and most of the alcohol is dissipated in the subsequent baking. B. is baked at about 390° F., and loses 15 to 20% in weight. The production of crust is due to conversion of starch into caramel and dextrin, which are more soluble and digestible than starch. Hence dry toast is more digestible than crumb b. The interior of the loaf is not heated much above 212° F.; nevertheless the digestibility of the starch is increased. The size and stability of a loaf is connected with the quality of the gluten of the flour.

Non-fermentation processes.—*Muffins* are aerated by beating flour and water vigorously to entrap air; and *sponges* owe their lightness to eggs beaten to a froth. In other processes aeration depends on carbon dioxide introduced or generated in the following ways: (1) Flour, salt, and water are mixed in an iron vessel, and impregnated with carbon dioxide under pressure. The baked product is 'aerated bread.' (2) Carbon dioxide is liberated from sodium bi-carbonate mixed with the dough by the lactic acid of sour milk. (3) Baking powders are employed, which contain sodium bicarbonate mixed with dry cream of tartar, tartaric acid, etc.,

and rice flour, so that carbon dioxide is liberated on adding water. (4) Ammonium carbonate is mixed with the dough, and is completely vitalized in the oven, yielding ammonia, carbon dioxide, and water vapor. White b. is made from wheat flour only; whole-meal b. from the entire wheat berry, from which, however, some of the outside husk or bran may have been removed before grinding. The superior dietetic value of the latter is doubtful, for although bran is rich in nitrogen substances and phosphates, its cellulose is not digestible, and may be irritable.

The following is the approximate composition of white b.: water, 38.5%; carbohydrates (chiefly starch), 52.4%; cellulose, 0.3%; proteins (nitrogenous), 7.2%; fats, 0.6%; salts, 0.8%; acidity, 0.2%.

Vienna Bread is made of very white flour leavened with compressed yeast, mixed with certain quantity of milk, and having glazed crust.

BREADALBANE (56° 30' N., 4° 15' W.), district, N.W. Perthshire, Scotland; mountains and lochs.

BREAD FRUIT, fruit of *Artocarpus incisa*, tree growing in East Indies and Pacific islands; in size and shape like melon, contains white nutritious juice; cut in slices and roasted for food. Another species, *A. integrifolia*, furnishes the Jack-fruit, eaten, also its roasted seeds, in Ceylon and S. India.

BREAKSPEAR, NICHOLAS (1159), probably name of Adrian IV., only Eng. pope; b. St. Albans; became abbot of house of St. Rufus, near Valence; as strict disciplinarian, made cardinal of Albano, 1146; after embassy to Norway acclaimed as 'Apostle of the North'; became pope, 1146; a wonderful orator, gentle, but of inflexible purpose; won notable victories over Ghibellines; quarrelled with Emperor Frederick Barbarossa.

BREAKWATER, a barrier built to shelter a harbor or roadstead from the violence of the waves, thus providing safe anchorage for ships. B's may be in the form of piers having one end connected with the land, or they may be placed across the entrance to a bay and completely isolated. They must be of the strongest possible construction in order to withstand the pressure of the waves, which has been known to attain a force equivalent to 8½ tons per sq. foot, as registered by the dynamometer. Huge blocks of masonry have been literally quarried out of the faces of breakwaters, and masses of concrete weighing 2,000 tons have been moved

from their foundations. The foundation of a b. usually consists of a mound of rough stones, or rubble. The superstructure may consist of a masonry wall built of comparatively small blocks and faced with granite, or it may be formed of huge concrete blocks weighing 50 or more tons.

One great drawback to a wall of small blocks is that during its construction the unfinished end is very liable to be shattered by storms. The concrete now in general use consists of a mixture of Portland cement and broken stone and sand. The blocks are made by pouring the mixture into boxes with movable sides, the sides being removed when the concrete sets. The blocks are laid in position by steam cranes, the largest of which are capable of laying 50-ton blocks anywhere within a radius of 100 feet. The blocks are brought to the required position in barges, and as they are lowered by the crane are accurately adjusted by divers. The foundation of a b. may also be formed of large bags of liquid concrete, which rapidly hardens under water. Blocks are sometimes formed on the spot where they are to remain by depositing the concrete liquid in cases. Additional blocks may be deposited round the foot of a b., forming what is called the 'apron.'

BREAST, See MAMMARY GLAND.

BREASTWORK, a term in military defense operations applied to earthwork elevations serving as a protection against enemy fire. Its thickness should be determined by the strength of the enemy artillery it is raised to resist. The ditch in front, from which the earth is taken to form the breastwork, presents a slightly additional impediment to any attack, and when it is thick enough, say from 10 to 24 feet, it can withstand the severest of assaults. It should be of sufficient height to shield men firing over it. A breastwork is frequently an emergency measure and hastily constructed.

BREATH, See RESPIRATION.

BRECCIA, rock composed of angular fragments united by matrix or cement. Cliff débris is sometimes consolidated into b.

BRECKINRIDGE, JOHN CABELL (1821-1875), Vice President of the United States; b. near Lexington, Ky. He was admitted to the bar and practised law until 1847. He fought in the Mexican war with the rank of major. He served two terms in Congress (1851-1855) and was elected as Vice President with James Buchanan as President. In 1860 he was a candidate for President on the pro-slavery ticket and received 72 electoral votes. From March to December 1861

BRECKINRIDGE

he held a seat in the United States Senate, resigning to enter the Confederate army. He became a major-general in 1862 and took part in the battles of Shiloh, Chickamauga, Chattanooga, Murfreesboro and the Wilderness. He was second in command to Early in the Shenandoah campaign. He was Secretary of War in the Davis cabinet and on the downfall of the Confederacy took refuge in Europe. He returned in 1868 and practised law until his death.

BRECKINRIDGE, JOSEPH CABELL (1842-1920), American military officer; b. Baltimore, Maryland. Like his distinguished uncle, John Cabell Breckinridge, Vice President in the Buchanan administration, he practised law, but unlike him, when the Civil War began he joined the Union army. He became a first lieutenant in 1863, captain in 1874, brigadier and inspector general in 1889 and major general of volunteers in 1908. He fought in the Santiago campaign in the Spanish-American war. From 1899 to 1903 he was inspector general of the army. In the latter year he retired, and afterward traveled extensively abroad.

BRECONSHIRE, BRECKNOCKSHIRE (52° N., 3° 30' W.), inland county, S. Wales; bounded by Radnor, Hereford, Monmouth, Glamorgan, Carmarthen, Cardigan; county town, Brecknock; surface mountainous; highest peak, Pen-y-Fan; chief rivers, Wye, Uak; traversed by Brecon and Aber-gavenny Canal; has several lakes and mineral springs. B. was occupied by Romans, after whose departure it belonged to Welsh princes till late XI. cent.; traces of Roman camps and roads remain. B. produces wheat, oats, barley; dairy produce; cattle and sheep raised; manufactures include woollens, leather, iron goods; minerals include coal, iron, limestone; area, 742 sq. miles. Pop. 1921, 61,257.

BREDA (51° 36' N., 4° 46' W.), fortress town, North Brabant, Holland. Charles II. made B. his home during part of his exile, and here issued Declaration of B. before Restoration. The second Dutch War terminated with Treaty of B., 1667; frequently stormed; linen, carpets. Pop. 30,000.

BREED, a group of individuals, within a species, closely related by birth, belonging to the same stock; offspring. Breeding, the art of continuing a race by selecting parents of the same stock (in-breeding), or of creating new races or cross-breeds by selecting parents of different stocks (cross-breeding or cross-

BREMERTON

ing); the act of procreating; nurture; deportment.

BREED'S HILL, a moderate elevation of ground in the Charlestown section of Boston, Mass., nearly half a mile from the much more famous Bunker Hill. Contrary to the popular belief, the so-called Battle of Bunker's Hill on June 17, 1775, was really fought on Breed's Hill. It was there that Prescott's men built their three redoubts on the night preceding the battle and it was there that the British were driven back. A tardy justice has been done by erecting the Bunker Hill Monument on Breed's Hill.

BREITENFELD (51° 26' N., 12° 22' E.), village, Saxony; Swedish victories, 1631 and 1642.

BREMEN.—(1) Free state of Ger. commonwealth, in basin of lower Weser; area, 99 sq. m.; cattle largely reared; market gardening and fishing. Pop. 295,700. (2) City of Germany, cap. of above state, a Hanseatic town on both banks of Weser (53° 5' N., 8° 49' E.); one of most thriving ports of Germany (in 1914, 1,416,800 tons shipping); headquarters of Norddeutscher Lloyd; jute spinning, woolen and cotton goods, shipbuilding; iron foundries, rope making, petroleum refining, distilling, brewing, and sugar refining; outport, Bremerhaven; river deeped to Bremen within recent years; great cotton market of Germany; large trade in tobacco; emigration center; World War put complete stop to trade; revolution just before Armistice, and workers' and soldiers' council set up; notable buildings are cathedral, town hall, church of St. Ansgarius, museum, observatory, famous wine-cellar below town hall. Pop. 255,000.

BREMER, FREDRIKA (1805-65); Swed. novelist; her earlier stories were of a simple, idyllic character, and were trans. into English by Mary Howitt; later she devoted her attention to the emancipation of women and to philanthropic work, and her subsequent novels were written with a view to the dissemination of her ideas.

BREMERHAVEN (53° 32' N., 8° 34' E.), seaport town, mouth of Weser, Germany; large docks; free port; shipbuilding, part of free state of Bremen (*q.v.*). Pop. 25,000.

BREMERTON, a city of Washington in Kitsap co. It is on the Puget Sound and on the line of the Washington Steamship Company. The city has an important naval depot and is the seat of the Puget Sound Navy Yard, which occupies nearly 250 acres and was constructed

BRENNAN

at a cost of over 10 million dollars. During the World War this yard was the scene of great activity and many ships were constructed here. There is a municipal park, public library, and other public buildings. Its chief industries are machine shops, cigar factories, sheet metal works, etc. Pop. 1920, 8,918.

BRENNAN, LOUIS (1852); Irish engineer; inventor of torpedo named after him and of gyroscopic mono-rail; superintendent of the government Brennan torpedo factory (1887-96); consulting engineer to same (1896-1907).

BRENNER PASS (47° 3' N., 11° 37' E.), Tirol; lowest pass (c. 4,500 ft.) crossing main chain of Alps, connecting Germany and Italy; railway opened, 1867.

BRENNUS, name of two Celtic chieftains of Gaul, the first of whom burned Rome, 390 B.C.; the second invaded Greece, 280 B.C.

BRENT, CHARLES HENRY (1862), American clergyman; b. New Castle, Ontario. He graduated with classical honors at Trinity College, Toronto, in 1884 and entered the Episcopal ministry. He had pastorates at St. Paul's Cathedral, Buffalo (1887); St. John the Evangelist, Boston (1888-91) and at St. Stephen's, Boston (1891-1901). In the latter year he was elected bishop of the Philippines. He was offered the bishopric of Washington in 1908 but declined. He was chief commissioner of the United States and president of the International Opium Conference (1908-09) and chairman of the United States delegation to the conference of the same body at the Hague (1911-12). His publications include *The Consolations of the Cross*, 1902; *Adventure for God*, 1904; *The Mind of Christ*, 1908; *The Sixth Sense*, 1914; *Prisoners of Hope*, 1915; and *Mount of Vision*, 1918.

BRENTA (56° 26' N., 12° 10' E.), river, Italy; enters Adriatic.

BRENTANO, KLEMENS (1778-1842) Ger. poet and novelist; bro. of Goethe's friend, Bettina von Arnim; author of *Godwi*, a romance, *Ponce de Leon*, a drama, and numerous other novels and dramas; also of some charming short stories, which have been trans. into English.

BRENTFORD (51° 29' N., 0° 18' W.), market town, Middlesex, England; scene of Dan. defeat, 1016; Royalist victory, 1642. Pop. 17,000.

BRESCIA.—(1) (45° 35' N., 10° 15' E.) province, N. Italy; area, 1,800 sq. miles. Pop. 1919, 595,547. (2) (45°

BREST-LITOVSK TREATY

33' N., 10° 13' E.) city, Lombardy, at foot of Alps; under Venice, XVI.-XVIII. cent's; captured by Austrians, 1849; joined Italy, 1859; ancient cathedral; iron goods; silks. Pop. 90,000.

BRESHKO - BRESHKOVSKAYA, MADAME, Russian revolutionary; was condemned to penal servitude for life (1874); after twenty years set free.

BRESLAU (51° 6' N., 17° 1' E.); chief town of Pruss. Silesia, Germany, on Oder; center of extensive manufacturing district; has important railway and water communication. Industries include manufacture of beet sugar, linens, woolens, cottons, silk, machinery, earthenware, distilling; large trade in cereals, wool, linen, coal, metals, timber, lumber, hemp, flax. B. has univ., R.C. cathedral, Jewish synagogue, some fine churches; town hall (XIV. cent.). Pop. 1919, 528,260.

BREST (48° 23' N., 4° 27' W.); fortified seaport, Finistère, France; leading naval station; large roadstead; fine military and commercial harbors; fortifications begun by Richelieu; Fr. fleet defeated by Lord Howe, June 1, 1794. Brest was one of the important depots for The American Expeditionary Force in the World War. Pop. 1921, 73,960.

BREST - LITOVSK, tn. and fortress, Grodno government, Poland (52° 15' N., 23° 42' E.), on r. bk. of Bug; great ry. center; added to Russia (1795); grain, wood, cattle, tobacco; in early part of Great War base of Russian operations in Poland; last of 'Polish Quadrilateral' to be evacuated (1915); entered by Germans Aug. 25, 1915; became headquarters of Prince Leopold of Bavaria.

BREST-LITOVSK TREATY, a short-lived compact ending hostilities between Russia, as one of the Allies, and the Central Powers in the World War of 1914-18, signed at Brest-Litovsk, a town in Poland. The treaty was repudiated by the other allied powers and the armistice of November 11, 1918 annulled it. By its terms Russia ceded to Germany and her allies, Austria-Hungary, Bulgaria and Turkey, approximately 400,000 square miles of territory containing a population of almost 6,000,000 and embracing Finland, Estonia, Livonia, Courland, Lithuania, Russian Poland and the Ukraine. The Central Powers undertook that the future of these regions should be decided by them in agreement with the respective populations. Russia was to refrain from all agitation against the other signatory powers and not to interfere in any way with the internal affairs

of the ceded districts. Russia also promised to leave all Turkish territory she held, to give up Russian Armenia, demobilize her army; evacuate all the territory she had renounced, make peace with the then Ukrainian Republic, surrender her fleet to Germany, and remove her mines from the Baltic and Black Seas as well as her fortifications on the Aland Islands. The treaty also contained economic agreements which practically gave Germany control of Russia's trade for an indefinite period. Germany undertook to evacuate all Russian territory she held other than the regions named as soon as a general peace between the Allies and the Central Powers was entered into. As events turned out, the general peace when it came forced Germany out of Russia altogether and destroyed her as a world power.

Germany held Russia by the throat at the time the treaty was made. The vicissitudes of the Russian revolution of 1917 brought the Bolsheviks into power who sought to end Russia's part in the war. An armistice was signed by the Bolsheviks and Germany on December 15, 1917, and extended to February 18, 1918, between which period peace terms were discussed. The Bolsheviks refused to concede the terms demanded by Germany and her allies, then announced a peace in their own by simply declaring that Russia had withdrawn from the war without signing any treaty. Germany countered by declaring that in the absence of a peace treaty a state of war continued. Her armies already held great areas of Russia and they resumed their advance in sweeping movements north and south. The new German invasion forced the Bolsheviks to announce their acceptance of the terms they had earlier rejected. Germany, however, went on overrunning the country, and captured 64,000 prisoners, 2,400 guns, 800 locomotives, and enormous stores of supplies and munitions. She kept up her depredations till the day on which the treaty was signed, March 3, 1918. Thus Russia had to yield the territory Germany demanded or submit to having it wrenched from her by conquest. The bargain, as already indicated, was vitiated by Germany's defeat in the World War.

BRETAGNE. See **BRITANNY**.

BRETHREN, CHURCH OF THE, a religious denomination of German origin, otherwise and more popularly known as the 'Dunkers.' The sect is allied to the Baptists, its distinguished ritual being a triple immersion. The three dippings are made for the Trinity

and each rite is designated by the utterance of the word 'Father,' 'Son' or 'Holy Ghost' in order. The denomination was established in Schwarzenau, on the Oder, in Germany, in 1708. It was marked by an extreme puritanism, a repudiation of all formulas of other creeds, and a hard and fast fidelity to the letter of the Scriptures. Fleeing from persecution and unpopularity in Europe, many members of the sect immigrated to the United States from 1719 onward, settling in Pennsylvania, and eventually spreading to the South and West. The first Bible in German in America was printed in Germantown under the Dunker's auspices. Rigid nonconformity and an austere aloofness from the world led the sects adherents to a Spartan abstention from so-called follies in dress, fashions, and domestic comforts and recreations. Social and educational progress only influenced many of them to recede from their exclusiveness and rigors and in 1881 severed the sect into defined divisions. Today the Dunkers embrace three orders, namely, the Conservatives, or German Baptist Brethren; the Progressives, or the Brethren Church; and the Old Order Brethren. The Conservatives, which are the most numerous, give some ecclesiastical power to their annual conferences, always outstanding events in their organization. The Progressives depart from the Conservatives in abiding by the congregational forms of government and discipline. The Old Order Brethren cling to old customs and the simple life. In the United States the denomination in 1921 had churches numbering 1,014 with a membership of 108,936 and 3,551 ministers. It maintains ten colleges, more than 1,200 schools, and conducts foreign mission work in Denmark, Sweden, China and India. The headquarters are at Elgin, Ill.

BRETON, CAPE (45° 58' N., 59° 46' W.), cape, E. coast, Cape Breton Island, Nova Scotia.

BRETON, JULES (1827-1906), Fr. artist; commenced as a painter of hist. subjects, which he eventually abandoned, and secured a high reputation by his landscape and rustic scenes.

BRETON, NICHOLAS (1545-1626); Eng. poet and novelist; in verse, *A Flourish upon Fancie*, *The Passionate Shepherd*, etc.; in prose, *A Mad World, my Masters*, and *Grimello's Fortunes*. He wrote some charming lyrics, and his stories are full of quaint beauty.

BREUGHEL, PIETER, BRUEGHEL (1525-69), noted Dutch genre painter. His s., Pieter B., the Younger (1564-1638), was less talented in same line;

younger s., Jan B. (1568-1625), was famous landscape painter and engraver, and f. of Jan B., the Younger (1601-78), painter of same school.

BREVE, musical measurement; in mediæval notations, half or third of long note; now written $\text{II} \cup \text{II} = 4$ minims; *semi-breve* = 2 minims; mediæval Lat. term for writ.

BREVET, form of allowance from person in authority, as in warrant or certificate; in army, grant of honorary rank.

BREVIARY, the 'prayer book' of the R.C. Church, from which much of the Anglican Prayer Book has been compiled. It contains psalms, hymns, portions of Scripture, and commentaries from the Fathers for every day. All priests (deacons and subdeacons) and monks are obliged to say aloud in public or private the daily portion. It is separate from the Missal (See *MISSAL* and *MASS*), which contains everything that pertains to the Eucharist. In the primitive Church the Bible, especially the psalms, formed the chief service book, and the B. as we have it only came into being in the C1. cent. The Roman B. is now used universally in the R.C. Church, except in Toledo, where the Mozarabic is used, and Milan, which retains the Ambrosian, and in certain religious orders (e.g. Dominican.) The B. is pub. in four vol's, one for each season, and also in one vol. and two.

BREWER, DAVID J. (1837-1910), an American lawyer and public official, b. in Smyrna, Asia Minor. He graduated from Yale University and after studying law practised in Kansas. He was appointed Justice of the Supreme Court of that State, in 1870. In 1884 he was appointed to the United States Circuit Court and in 1889 became a Justice of the Supreme Court of the United Staes. In 1896 he was president of the Venezuela Boundary Commission and was a member of the Venezuela Arbitration Tribunal of 1898.

BREWER, EBENEZER COBHAM (1810-97), author of widely used *Dictionary of Phrase and Fable*, etc.

BREWING, the process of beer-making, may be divided into the preliminary process of malting, which prepares the material for brew and brewing proper.

Malting.—Malt consists of barley grains which have been induced to germinate so as to produce diastase, and then dried to arrest their growth. A barley grain contains within its husk and skin the germ or embryo, and the endosperm or food material con-

sisting of starch-containing and aleurone (nitrogenous) cells.

Brewing consists in making beer from malt, with the addition of hops, etc. In a gravitation brewery the water and grist are elevated to the tower, whence they gravitate as required.

BREWSTER, SIR DAVID (1781-1868), Scot. scientist; principal of Edinburgh Univ.; made many discoveries in the science of optics; edit. the *Edinburgh Encyclopaedia* (1808-30), contributed to *Encyclopaedia Britannica*, and wrote *Life of Newton* (1831); *Martyrs of Science* (1841); *More Words than One* (1854); knighted, 1831.

BREWSTER, WILLIAM (d. 1644); one of the principal 'Pilgrim Fathers.'

BRIALMONT, HENRI ALEXIS (1821-1903), Belg. fortification expert; b. Venlo, Limburg; ed. Brussels military school; became sub-lieut. of engineers in army (1843); lieut.-gen. (1877); supervised Belgian and Rumanian defense works; pub. military studies and originated *Le journal de l'Armée Belge* (1850).

BRIAN (926-1014), chief king of Ireland.

BRIAND, ARISTIDE (1862). Fr. statesman; four times prime minister; in 1899 was an avowed Syndicalist; advocating general strike; entered the Chamber of Deputies in 1902; brought forward proposals for separation of Church and State (became law 1905); as minister of public worship in Clemenceau's cabinet (1906-7) administered the new law with firmness and tact; as prime minister during Great War is credited with bringing Rumania into the struggle; unrivaled as a parliamentary orator. He was minister of Foreign Affairs from January 1916 to March 1917, and again from January 1921 to January 1922. He was a delegate to the Conference on the Limitation of Armaments at Washington in 1921, and strangely defended the French position in several addresses. See *CONFERENCE IN THE LIMITATION OF ARMAMENTS*.

BRIAREUS, Ægeon, god of Gk. mythology; with 300 arms and 50 heads.

BRIBERY, the purchase of advantages from persons who have no right to profit by their disposal.

BRICKS. The word 'brick' is derived from the Fr. word *brigue*, meaning a piece, or fragment, and is the Eng. name given to a piece of worked and moulded clay, slightly over 9 in. in length by $4\frac{1}{2}$ in. in width, and used for building

purposes. Sun-baked bricks were in use amongst the anc. Egyptians, Assyrians, and Babylonians, and some of these are still to be seen in a perfect state of preservation. Kiln-baked bricks, however, mixed with chopped seeds or straw, were also employed in very early times by these peoples. They were also largely used by the Romans, and by them were introduced into England. After the withdrawal of the Romans brickmaking fell into disuse in England until the craft was reintroduced by the Flemings in the 13th cent. But it was not until the 15th cent. that bricks came again into any general use. The manufacture of brick forms one of the most important divisions of the clay-working industry in the United States. Some of the best clays in the world are found in various places in New York and along the Hudson in New York State. The production of common brick in the United States is valued at over \$40,000,000 annually, and fire brick at nearly \$70,000,000. These are the two principal kinds of brick used in building.

BRIDE, a newly married woman. The origin of 'bride-cake' dates back to the days of ancient Rome when part of the marriage ceremony consisted of the bridal pair eating of a cake made of salt, flour, and water. Later it became customary to shower grains of wheat over the bride; subsequently small cakes were flung at the bride, and by such developments we have reached the pretentious sugared confections of the present day.

BRIDEWELL, district, S. of Fleet Street, London; celebrated prison demolished, 1864.

BRIDGE, card game, a development of whist, variously reputed to be of Dutch, Russ., or Turk. origin. Introduced into Britain first at the Portland Club in 1894, it has since increased enormously in popularity. Four persons take part in the game, two being partners against the other two, an ordinary pack of cards being used. The dealer decides trumps ('no trumps' is a possible declaration) after the players have examined the cards, or he may leave the declaration to his partner, who *must* then declare. This partner does not play his hand, which is exposed on the table as a 'dummy' hand, and played, in addition to his own, by the dealer. The strength of the cards in making tricks, and the general scheme of play, is the same as in whist.

The value of each trick won, over six depends on the trumps declared, and is: in no trumps 12, hearts 8, diamonds 6, clubs 4, spades 2. After the declaration

of trumps the opponents may double the value of the tricks, when the first pair may redouble, and so on. The partners who first score 30 points win a *game*, and those who first win two games win a *rubber*, a rubber counting 100. If one side wins all the tricks it scores 40 points, *grand slam*; if it wins 12 tricks, 20 points, *little slam*. Points are also given for 'honors,' which are ace, king, queen, knave, ten, in a suit declaration, and for *chicane*, the case when a player has no trump card in his hand; for honors the scoring is somewhat more complicated. The total score of each side includes the points for tricks, rubbers, honors, grand slam, etc., all added together.

BRIDGE, SIR CYPRIAN ARTHUR GEORGE (1839), Brit. admiral; served in the Crimean War, Indian Mutiny, and on Burmese frontier; commander-in-chief on Australian station (1895 - 8), China station (1901-4); inquired into Dogger Bank incident (Oct. 1904); has written on naval warfare, sea power, and pub. *Some Recollections*, 1918; one of commissioners to inquire into the conduct of the Mesopotamian campaign.

BRIDGE, SIR FREDERICK (1844), English musician and author; b. Oldbury, Worcestershire. He was educated at the Cathedral School, Rochester, and in 1850 became organist of Rochester Cathedral where he remained nine years. He was organist of Trinity Church, Windsor (1865-69), and of Manchester Cathedral (1869-75). From 1896 to 1922 he was conductor of the Royal Choral Society. Knighthood was conferred on him in 1907. He has written many cantatas, symphonies and oratorios and in addition has published *Samuel Pepys, Lover of Music*, 1904; *A Westminster Pilgrim*, 1919; and *The Old Cryes of London*, 1921.

BRIDGE OF SIGHS. See **VENICE**.

BRIDGEHEAD, fortification, either temporary or permanent, protecting exit from a bridge on farther bank; example, Rhine fortresses; must secure space sufficient for deployment of fighting forces after crossing bridge; Fr. *tête de pont*; in open warfare term often applied to ground held by force on enemy's side of river crossing to cover deployment of troops on farther bank.

BRIDGEPORT, a city of Connecticut, the county seat of Fairfield co. It is on the Long Island Sound, on the New York New Haven and Hartford Railroad, and at the mouth of the Pequonnock River. 18 miles southwest of New Haven. The city occupies both sides of the river which is spanned by bridges. The west-

ern part rises to an elevation of about 70 feet above high water and is known as Golden Hill. Here are many of the finest residences of the city. There are many public parks, the most attractive of which is Seaside Park. This has a short sea wall and a picturesque drive. It contains a Soldiers' Monument and the statue of Elias Howe, inventor of the sewing machine. B. is one of the most industrial cities in the country and it was especially prosperous during the war when many of the large plants making munitions and other war materials were greatly enlarged. Among the important interests are the Singer Sewing Machine Company, the Union Metallic Cartridge Works, the Remington Arms Company, the General Electric Company, and the Cram Company. In addition there are manufactures of carriages, furniture, bicycles, typewriters and cutlery. The public buildings include a U.S. Government building, county courthouse, Barnum Memorial Institute, and many hospitals and asylums. There are several banks and newspapers. Bridgeport was settled in 1670 under the name of Fairfield, and was incorporated as a city in 1836. Pop. 1920, 143,152.

BRIDGES. Elevated structures erected across a gap between other structures or between points of land separated by water or depressions in the earth. Many of these necessary erections raised across rivers for pedestrian, wheel and railroad traffic are remarkable for the engineering skill developed in their construction and the architectural beauty of their designs. Bridges are great landmarks of cities and sections. New York, London, Paris and Berlin have river structures so characteristic in their commanding strength and design that they loom as outstanding facts of each city. The same may be said of all towns whose means of communication are augmented by the genius of the builder of bridges.

The modern bridge is constructed of stone, concrete or steel arches, or embody types of steel structures known as simple truss, continuous, cantilever, suspension, and high viaduct bridges. Among those of steel arches, a representative erection is that at Hell Gate, N. Y. Metropolis, Ill., has a typical simple truss bridge. At Sciotsville, Ohio, is a notable example of the continuous bridge, which crosses the Ohio river over two spans each 775 feet long. Suspension bridges have impressive representatives in two erected over the East River, at New York City, namely, the Williamsburg and Brooklyn bridges. Lethbridge, Canada, has a high viaduct bridge rising 5,327 feet on a span of 314 feet.

Bridge construction clung to old methods until some 160 years ago, about the time when industrial development began to provide better and cheaper materials and stimulate progress in engineering science and technology. The growth of railroads also stood out as a leading influence in the building of bridges as they are today. Of all present types the truss bridge is wholly new and its use has largely affected other types. The truss displaced the beam; it is a mainstay in arched bridges and also figures as supports of suspension bridges built to bear modern traffic. The truss structure of a bridge comprises a network of more or less slender bars linked up in a triangular cross work. They were first built of wrought iron (about 1850). Previously the truss features frequently formed a combination of both iron and timber. There would be timber struts and iron tension rods; then came iron rolled beams and plate girders for short spans, and truss bridges with cast iron struts and wrought iron tie rods for longer spans. Wrought-iron bridge construction only developed, both as to trusses and plate girders, largely affecting the use of time-honored wood and stone arches, except for minor bridge work. Soft steel, nickel steel and silicon steel in turn displaced wrought iron in bridge building. The production of Portland cement provided another serviceable material, but for a long time stone arches remained in favor despite its growing use. Cement concrete finally (about 1890) came into use for arches. It was followed by reinforced concrete, that is, concrete in which steel rods are embedded in the required directions to provide tensile strength—for beam and arch construction, in which this material is now extensively used, especially for city bridges and those on leading country roads, as well as for railways. A remarkable example of concrete bridge work is the Tunkhannock Viaduct of the Delaware, Lackawanna and Western Railroad in Pennsylvania, believed to contain a greater volume of concrete than any other bridge of its kind.

Bridge engineers have achieved great feats with various types of suspension and cantilever bridges calling for long spans. Their enterprise and ingenuity have been largely due to improved processes of metal manufacture, which greatly increased the tensile strength of wrought iron and steel. As bridge materials, wrought iron and soft steel are of high strength in both tension and compression (50,000 to 70,000 pounds to the square inch). Being also malleable and tough, holes can be punched in them and pieces bent. Safe stresses are 15,000 to 20,000 pounds. Other steel

of high strength, like nickel steel, can be stressed to 20,000 to 30,000 pounds to the square inch. Cast iron, being brittle and liable to cracks and internal defects, is not now used in bridgework except for such parts as bearing blocks. In tension is it only about twice as strong as wood, which can be stressed to about 10,000 pounds to the square inch, but cast iron is very strong in compression—about 100,000 pounds to the square inch. Bridges must be made strong enough to withstand the forces brought to bear on them. They must bear their own weight, or the stresses of its dead load; then the traffic moving over them, or the live or moving load, and the impact and vibration produced therefrom. Wind pressure is quite a serious burden, not to mention the momentum of a stopping train.

Railroads have produced most modern bridges. On American lines they number some 80,000. Most of them are built of steel, with trusses or plate girders designed to sustain uniform loads ranging from 3,000 to 4,800 pounds per linear foot of track, according to the length of span and the service required.

Highway bridges bear loads of from 1,000 to 1,800 pounds per linear foot of track and are constructed of wood, metal, masonry or concrete. Over rivers in some parts of the country are moveable bridges or drawbridges to permit of a clear passage way for vessels. These are known as swing, rolling or lift bridges, swing bridges being those most commonly used. Here and there are pontoon bridges, a development of the ancient bridge of boats. The longest one is a railroad structure running across the Mississippi river at Prairie du Chien, Wis.

Bridges of enduring material live long when well built and maintained. Steel bridges, however, must be regarded as temporary, with a life limited to the crystallization of their metal. Stone bridges, despite being subject to deterioration of mortar joints, have lasted for hundreds and even thousands of years, given good foundations. Modern bridges tend to deteriorate from absolute decay due to increase of traffic loads or other causes before their limit of life has been indicated.

BRIDGES, ROBERT (1844); poet laureate since 1913; formerly physician, and practised at various London hospitals; retired 1882; has published many volumes of plays in experimental meters, narrative poems and lyrics; *Poetical Works*, 1898-1905; *The Spirit of Man*, an anthology in English and French, 1916; and *October and other Poems*, 1920.

BRIDGES, ROBERT (1858); pseudo-

nym 'Droch,' American author and poet; b. Shippensburg, Pa. He graduated at Princeton and for some time was connected with the New York Evening Post. In 1887 he became assistant editor of Scribner's Magazine. He wrote extensively and acceptably for magazines, and his reviews for *Life* over the signature 'Droch' added materially to his reputation, because of their humor and originality. Among his publications may be cited *Overheard in Arcady*, 1894; *Suppressed Chapters and Other Bookishness*, 1895; and *The Roosevelt Book*, 1904.

BRIDGET, ST. (1302-73), founded *Bridgettines* (Augustinian Order) in Sweden; lived in Rome from 1350. St. Bridget, or St. Bride, popular Irish saint of V. cent.

BRIDGETON, a city of New Jersey, the county seat of Cumberland co. It is on the Cohancy River and on several railroads, 38 miles south of Philadelphia. Bridgeton is an old community and before the Revolutionary War was of considerable importance. It is the center of a large agricultural community. Its industries also are important and include the manufacture of glass, gas pipe, nails, machinery, woolen goods, etc. There is a beautiful park which contains a lake and an athletic field. There are several private educational institutions and an excellent public high school. The city is a popular summer resort. Pop. 1920, 14,323.

BRIDGETOWN (13° 9' N.; 59° 35' W.), port, Barbados; trading center; seat of bishopric. Pop. 17,000.

BRIDGEWATER, a town in Massachusetts, in Plymouth co. It is on the New York, New Haven and Hartford Railroad, and is 27 miles south of Boston. The town includes 5 villages. It is the site of the State Normal School, the State Farm, and the State Almshouse. There is a public library, a savings bank, and manufactures of iron, boots, shoes, etc. Pop. 1920, 8,438.

BRIDGMAN, FREDERIC ARTHUR (1847), American painter; b. Tuskogee, Ala. His early studies were pursued at the Brooklyn Art School and the New York Academy of Design. In 1866 he went to Paris and entered l'Ecole des Beaux-Arts where he came under the influence of Gerome that revealed itself later in his works. He exhibited with great success in Paris and New York and won honors from foreign governments. Some of his most noted paintings are *An American Circus in Normandy*; *L'Arabe*; *The Destruction of Pharaoh's Hosts*; *Procession in Honor*

of *Isis* and *The Greek Girl*. In addition to his art work, he has composed symphonies and other orchestral works.

BRIDGMAN, LAURA DEWEY (1829-89), Amer. deaf-mute; was also blind. Carefully taught in blind asylum of Boston, her mind developed in spite of her affliction. Her own impressions and the observations made by her instructors, have proved of great service to the teachers of deaf-mutes and the blind.

BRIDGWATER (51° 8' N., 3° 7' W.), town, on Parrot, Somersetshire, England; bath-bricks. Pop. 17,000.

BRIDLINGTON, BURLINGTON (54° 6' N., 0° 12' W.), watering-place, East Riding, Yorkshire, England; remains of XIII.-cent. priory; fine bay and harbor; chalybeate mineral spring. Pop. 15,000.

BRIE (48° 44' N., 3° E.), small district, France; E. of Paris; corn, cheese.

BRIEF.—(1) A brief (in law) is an epitome or abridged statement of a client's case for the instruction of counsel, with a reference to the points of law supposed to be applicable to the case. (2) Papal briefs were sent by the Pope to individuals or religious communities, relating to matters of privilege or discipline. (3) Church briefs were letters sent out in the king's name, after the Reformation, to abb's, bp's, the clergy, and magistrates, licensing them to collect money for church building and similar objects. Since 1853 such briefs have been in abeyance.

BRIEG (50° 51' N., 17° 29' E.), town, on Oder, Prussian Silesia. Pop. 26,000.

BRIENNE, JOHN OF (1237), Fr. noble who became king of Jerusalem by marrying (1210) its queen, Marie de Montferrat; regent for their dau., Yolanda or Isabel, 1212; elected Byzantine emperor, 1229.

BRIENNE - LE - CHÂTEAU (48° 22' N., 4° 33' E.), town, Aube, France; here Napoleon studied at military school, 1779-84; and defeated Allies, 1814.

BRIENZ (46° 45' N., 8° E.), town and lake, in canton Bern, Switzerland; tourist resort.

BRIERLEY HILL (52° 30' N., 2° 10' W.), town, Staffordshire, England; coal, iron, fire-clay. Pop. 13,000.

BRIEUX, EUGÈNE (1858), Fr. dramatist, whose plays deal mainly with social abuses and sexual problems; member of Fr. Academy. Bernard Shaw's *Three Plays by Brieux*, 1916; contain *La Femme Seule*, *La Robe Rouge* and *Les Remplacantes*. *Les Avaries* ('Damaged Goods').

BRIGGS, CHARLES AUGUSTUS (1841-1913), Amer. theologian and Old Testament scholar.

BRIGGS, FRANK OBADIAH (1851-1913), American legislator; b. Concord, N. H. He entered military life and graduated from the United States Military Academy in 1872, resigning however from the army in 1877 to take a position with the Roebling Co. of Trenton, N. J., where he became assistant treasurer. He had a marked predilection for politics and was elected Mayor of Trenton on the Republican ticket, 1899-1902; State Treasurer of New Jersey, 1902-07; and United States Senator, 1907-13. From 1904 to 1913 he was chairman of the Republican State Committee of New Jersey.

BRIGHAM, a city of Utah in Box Elder co. It is on the southern Pacific and the Oregon Shortline Railroads. The city is the center of an important fruit growing and agricultural community. Its industries include canning and cement factories, planing mills and a lumber yard. There is a public library and other public buildings. Pop. 1920, 5,282.

BRIGHOUSE (53° 43' N., 1° 46' W.), town, W. Riding, Yorkshire, England; woolen factories. Pop. 22,000.

BRIGHT, JOHN (1811-89), Brit. statesman and manufacturer; b. Rochdale; s. of a Quaker cotton manufacturer; ed. at a Friends' School at Ackworth and afterwards at York and Newton. He entered Parliament (1843), already famous as an orator. In 1847 he was a member for Manchester and advocated Free Trade, electoral reform, and religious freedom. He opposed the Crimean War (1854). President of Board of Trade (1868), supported disestablishment of Irish Church (1869), and Irish Land Act (1870), and became Chancellor of Duchy of Lancaster (1873). Unable to support Government's Egyptian policy, he retired (1882), and strenuously opposed Gladstonian Home Rule Bill (1886). He was Lord Rector of Glasgow Univ. (1880).

BRIGHT, RICHARD. See **BRIGHT'S DISEASE**.

BRIGHTON (50° 49' N., 0° 8' W.); town, on Eng. Channel, Sussex; fishing village, XVIII. cent., now fashionable holiday resort; mild climate; magnificent promenade extending over 3 miles; splendid buildings; educational center; 'Pavilion' originally built as residence of George IV.; aquarium. Pop. 1921, 142,427.

BRIGHTON (37° 57' S., 145° 1' E.);

watering-place, Victoria, Australia. Pop. 10,500.

BRIGHT'S DISEASE, inflammation of kidneys, named after the first describer, Richard Bright (1789-1858). It is characterized especially by changes in the urine, and by dropsy, first noticeable in the face, and a pasty color of the skin. The onset is usually sudden, the first symptoms being chilliness, pains in the back, vomiting, and slight rise of temperature; an attack usually lasts four or five weeks, and may go on to the chronic form. The urine is scanty, of high specific gravity, turbid, and contains blood corpuscles, hyaline, epithelial and blood casts, and much *albumen*. The attack usually follows an acute specific fever (especially scarlet fever) or a chill. The treatment is to diminish the proteids in nourishment in order to rest the kidneys, give water and other diluents, and increase the action of the skin and bowels; tonics are given during convalescence.

BRILLAT-SAVARIN, ANTHELME, a French gastronomist, b. in 1755 at Belley. In 1793 he became mayor of Belley. To escape proscription he fled from France to Switzerland, and subsequently to America, where he played in the orchestra of a New York theatre. He returned to France on the fall of Robespierre and pub. his famous *Physiologie du Gout*, a witty compendium on the art of dining. Many editions and translations of the work have been published.

BRIMSTONE. See **SULPHUR**.

BRINDABAN (27° 33' N., 77° 44' E.), town, Muttra district, United Provinces, India; holy city of Hindus, and place of pilgrimage. Pop. 23,000.

BRINDISI (40° 40' N., 18° 1' E.), seaport town, S. Italy, on Adriatic; archiepiscopal see; important station for passengers and mails to and from the East; ancient *Brundisium*; besieged by Cæsar, 49 B.C.; wine and oil exported. Pop. 30,000.

BRINTON, DANIEL GARRISON (1837-99), American archaeologist and ethnologist, b. at Thornbury, Penn.; graduated at Yale and studied medicine in Paris and Heidelberg. Acted as surgeon in the Union army during the Civil War. Was appointed professor of American Linguistics and archaeology at University of Pennsylvania in 1886, a post which he held until his death. Among his works are: *The Myths of the New World*, 1868; *American Hero Myths*, 1882; *The American Race*, 1891; *Library of American Aboriginal Literature* (8 vols.), 1882-90.

BRINVILLIERS, MARIE MADELINE MARGUERITE D'AUBRAY, MARQUISE DE (c.1630-76), infamous Fr. poisoner; beheaded and her body burned (Paris, July 16, 1676).

BRISBANE (27° 28' S., 153° 2' E.), town, Australia; capital of Queensland, on river B., 25 miles from sea; extensive wharf accommodation, dry-docks; chief trading center of colony; port of call, seat of Catholic abp. and Anglican bp.; North and South B. connected by bridge; founded as convict station, 1825; made free settlement, 1842; exports wool, gold, hides. Pop. 1921, 209,699.

BRISBANE, ARTHUR (1864); Amer. editor; b. Buffalo, N. Y. He received a public school education and later spent five years abroad, chiefly in France and Germany. He became a reporter on the New York Sun in 1882 and later served that paper as London correspondent. He edited the Evening Sun for a time and for seven years was on the editorial staff of the Evening World. It was not, however, until he became connected with the Hearst newspapers as editor of the Evening Journal that he established a world-wide reputation as one of the ablest if not the ablest newspaper editor in the United States. The simplicity and clearness of his style, the brevity and incisiveness of his writings, his mastery of satire, combined with the fullness of his information, has given him a power and influence not surpassed by any editor of his time. He took the popular side on most questions and his writings were tinged with radicalism. He did effective work in exposing and scourging corrupt practices in business and politics, but he has also aroused antagonism at times by groundless accusations and unjustified attacks. He has lectured at the Columbia School of Journalism and has published Editorials From the Hearst Papers and *Mary Baker Eddy*, 1908. In 1917 he purchased the Washington Times, and in 1918 the Evening Wisconsin, both of which were later included in the Hearst system. Since 1918 he has been editor of the Chicago Herald and Examiner.

BRISBANE, SIR THOMAS MACDOUGALL (1773-1860), Scot. general and scientist; gov. of New S. Wales; gave name to Brisbane, Queensland; made list of stars.

BRISSON, EUGÈNE HENRI (1835-1912). Fr. Radical statesman; prime minister (1885-1898); president of the Chamber (1894-98, 1906); exposed Panama scandals, and insisted on revision of Dreyfus case.

BRISSOT, JACQUES PIERRE (1754-93), Fr. revolutionary; edit. *Patriote francais*, 1789-93; orator of Jacobin Club etc. Girondists were also called *Bris-sotins*.

BRISTED, CHARLES ASTOR (1820-74), American author; b. New York City. He graduated at Yale in 1839, following which date he spent five years in post-graduate studies at Cambridge University, England, where he won distinction and carried off many prizes in literary competitions. Under the pseudonym of 'Carl Benson' he contributed to many English and American magazines, his writings being noted for their clearness, interest and flawless style. His publications include *Selections from Catullus*, 1849; *The Upper Ten Thousand*, 1852; *Pieces of a Broken-Down Critic*, 1857; and *The Interference Theory of Government*, 1867.

BRISTOL (51° 28' N., 2° 35' W.), city, England; in Gloucestershire and Somersetshire, at junction of Frome and Avon; important port, has good dock accommodation; large trade with U.S.A., Canada, Indies, and other parts of empire; exports coal, salt, tin-plates, machinery, cottons, chemical products, etc.; imports provisions, timber, grain, oils, marbles, ores, etc. In district are traces of Rom. and Brit. camps; while under Dan. rule, noted as slave market; surrendered to William the Conqueror, after which it was fortified; scene of rising against Edward II. in 1313; supported Parliament in Civil War; suffered three sieges; scene of riots at various dates in XVIII. cent. and during Reform Agitation, 1831. Pop. 1921, 377,061.

BRISTOL, a town in Connecticut, in Hartford co. It is on the New York, New Haven and Hartford Railroads, 17 miles west of Hartford. Its industries include the manufacture of clocks, brass goods, tools, bicycles, bells, etc. There is an excellent public library. Pop. 1920, 20,620.

BRISTOL, a borough of Pennsylvania, in Bucks co. It is on the Pennsylvania Railroad and the Delaware River, 21 miles northeast of Philadelphia. It is an important manufacturing city and its industries include the making of carpets, hosiery, and foundry products. It is also the center of a rich truck farming region and has considerable trade in these products. Pop. 1920, 10,273.

BRISTOL, a town of Rhode Island, the county seat of Bristol co. It is a port of entry and is on Narragansett Bay and on the New York, New Haven and Hartford Railroad, 15 miles south-

east of Providence. There is an excellent harbor which gives facilities for passenger and freight service for Fall River and Providence. Bristol is the seat of the Herreshoff shipyards, where many famous ships and yachts have been constructed. Here many torpedo boats were built during the World War. The town is the center of an important market gardening community and its manufactures include the making of rubber, woolen and cotton goods, etc. Bristol was the seat of King Philip, the great Narragansett Indian chief. Pop. 1920, 11,375.

BRISTOL, a city in Sullivan co., Tennessee, and Washington co., Virginia. It is on several important railroads and is 130 miles east of Knoxville. The boundary line between the two States runs along the main street of the city, east and west. There are several important educational institutions including Kings College and Southwest Institute for Young Women. Its industries include the manufacture of tobacco, cotton, woolen goods, leather, etc. Pop. 1920, with the Virginia section of city, 14,176.

BRISTOL CHANNEL (51° 20' N.; 4° 30' W.), inlet of Atlantic between S. Wales and S. W. counties of England.

BRISTOL, FRANK MILTON (1851), American Methodist Episcopal bishop; b. Orleans, co., N. Y. He held important pastorates at Trinity Church, Chicago; First Church, Evanston, Ill., and Metropolitan Church, Washington, D. C. His wide culture and unusual eloquence gave him a national reputation, and his services as a lecturer were in great demand. In 1908 he was elected bishop. Among his more notable publications are *Addresses*, *Shakespeare and America*, *Providential Epochs* and *The Ministry of Art*.

BRISTOL, MARK LAMBERT (1868), American naval officer; b. Glassboro, N. J. He graduated from the United States Naval Academy, 1887; entered the navy as an ensign in 1889 and advanced through the various grades of the service, reaching the rank of captain in 1913. He served on the battleship Texas at the battle of Santiago in the Spanish-American war, and commanded the Oklahoma in European waters during the World War. He was appointed High Commissioner to Turkey in 1920.

BRISTOW, BENJAMIN HELM (1832-96), Amer. soldier, lawyer, and statesman; Solicitor-General (1870-72); Sec. of the Treasury (1874-76); ended scandals of 'Whisky Ring.'

BRISTOW, JOSEPH LITTLE (1859), American editor and legislator; b. Flemingsburg, Ky. He was editor of the *Salina* (Kan.) Republican and active in politics. In 1893 he was appointed fourth assistant Postmaster-General and in 1900 sprang into nationwide prominence by exposing frauds in the Post-Office Department. Later he reorganized the Cuban postal service. In 1905 President Roosevelt made him special commissioner to the Panama Railroad. He was elected to the United States Senate in 1909 and in 1912 when the split in the Republican party occurred was an ardent supporter of the Progressive movement. In 1915 he was made Chairman of the Kansas Utilities Commission.

BRITAIN (Lat. *Britannia*), Rom. name for island constituted by England and Scotland; now whole territory of Brit. Isles (q.v.).

BRITANNIA, Lat. form of Britain and its personification in female figure on coins, etc. *Rule B.*, written by Thomson (q.v.), is patriotic Brit. anthem.

BRITANNICUS (c. 41-55), s. of Rom. Emperor Claudius; suffered death by poisoning.

BRITISH ASSOCIATION, imperial society, founded at York, 1831, by Sir D. Brewster for promoting scientific research; meets annually, occasionally in the colonies.

BRITISH CENTRAL AFRICA. Until 1907 what is now officially known as Nyasaland Protectorate was called 'British Central Africa.' The latter term is now commonly used to denote all Brit. territory in Central Africa (as distinguished from Brit. East, Brit. West, and Brit. South Africa)—viz., Nyasaland and that part of Rhodesia N. of the Zambesi.

Nyasaland (9° 30'-17° S.; 33°-36° E.), Brit. protectorate; bounded on N. by E. Africa; E. and S. by Port E. Africa; W. by N. Rhodesia; area, 39,315 sq. m. Surface is mostly lofty plateau over 3,000 ft. above sea-level; numerous streams flow into Lake Nyasa, which drains by Shire R. into Zambesi. From Blantyre (chief town), in Shire 'Highland,' railway (113 m.) runs to Port Herald on Port. border, where there is steamer service to Chinde on coast by Shire and Zambesi. Stevenson's Road connects Lakes Nyasa and Tanganyika. First explored by Portuguese, Nyasaland was later and more thoroughly mapped by Livingstone; British Central Africa Protectorate established (1892); proclaimed Nyasaland Protectorate (1907). Nyasaland is administered by gover-

nor, assisted by executive and legislative councils and district residents; seat of administration is Zomba. Pop. (largely concentrated in healthy Shire Highlands) consists of 1,137,300 natives, 700 whites, and 400 Asiatics; missionary center; sleeping-sickness in parts. Chief exports are tobacco, cotton, tea, rubber, beeswax, coffee; imports include textiles, machinery, tools, food-stuffs, and hardware. See MAP AFRICA.

BRITISH COLUMBIA, prov.; Dominion of Canada (49°-60° N., 114°-141° W.); between Rocky Mts. and Pacific; include Vancouver and Queen Charlotte Islands. The surface is very mountainous, the Rockies reaching a height of 13,068 ft. in Mount Robson. To the W. of the Rockies are the Sulkirk and Gold Ranges, which rise to 11,000 ft.; Cascade or Coast Range, rising to 10,000 ft. Chief rivers are the Columbia, Fraser, Thomson, Peace. Climate varies; mild near coast, dry and hot in S. interior, severe winters in N.; heavily wooded; important commercial trees are Douglas fir, maple, yellow cypress, red and yellow cedar, white spruce; much pastoral and agricultural land. Chief industries are lumbering, mining, fruit growing, ranching, fishing, canning fur sealing; very rich in minerals; gold is worked in the Yukon valley and at Cariboo and Cootenay; coal, silver, lead, copper, are also mined; the working of cinnabar, platinum, gypsum, asbestos, plumbago, has begun. Cap., Victoria, is situated in Vancouver I.; other towns, Vancouver and New Westminster on mainland; univ. of prov., Vancouver (1913); railways being greatly extended. Administration is carried out by lieutenant-governor, assisted by executive council and legislative assembly; represented in Federal Parliament by three senators and seven members of lower house. Brit. Columbia became a Brit. colony (1858); united with Vancouver (1866); admitted into Dominion of Canada (1871); Alaska boundary with U.S. settled (1903). Area, 383,000 sq. m.; pop. 392,500. See MAP CANADA.

BRITISH EAST AFRICA, Brit. terr. in E. Central Africa, comprising (1) E. Africa Protectorate, (2) Uganda Protectorate (3) Zanzibar Protectorate, known after June 23, 1920, as Kenya Colony. For the former territory of Ger. East Africa, see under EAST AFRICA.

East Africa Protectorate (1° N., 39° E.), bounded by Abyssinia (N.), Uganda Protectorate (W.), former Ger. E. Africa (S.), Ind. Ocean and Italian Somaliland (E.); seaboard about 400 m.; coastal strip from former Ger.

frontier to Kipini, Lamu Archipelago, and Kisumu, near Juba, are leased from Sultan of Zanzibar. Coast regions are flat and unhealthy; parts of interior healthier; traversed by volcanic mountain ranges; highest peak, Mt. Kenia (17,000 ft.). Chief rivers are Juba, Tana, Sabaki; principal lakes, Sugota, Naivasha, Baringo, and part of Rudolf and Victoria Nyanza.

In interior are valuable forests and fine pasture lands; southern and north-eastern districts fertile. Principal products are maize, rice, coco-nuts, hemp, coffee, wheat, valuable timber, ostriches, sheep; exports ivory, rubber, hides, skins, cotton, copra, tobacco. Mineral resources as yet unimportant. Country gives promise of great developments. Mombasa-Victoria (Uganda) State Ry. (618 m.) was completed in 1902; steamers on Lake Victoria Nyanza; cable between Zanzibar and Mombasa. Coast is inhabited by Swahilis and Arabs; Somalis, Gallas, Bantu, etc., inland. Paganism predominates, but Mohammedanism is spreading rapidly, especially on coast. Principal towns are Nairobi (cap.), Mombasa (chief port), Lamu, Kisumu, Malindi (ports), Kisumu, Nyeri. Portuguese arrived in 15th cent. and built forts at Mombasa, Lamu, and Malindi; terr. conquered by the Imam of Muscat (1698); Germans acquired a protectorate over Witu (1884); Brit. E. Africa Co. assumed control over Sultan of Zanzibar's mainland possessions (1888); boundary agreements made between Germany and Britain (1886, 1890), Britain and Italy (1891), Britain and Congo Free State (1894); protectorate of Great Britain accepted by sultan (1890); administration taken over by Foreign Office (1895), by Colonial Office (1905); explored by Krapf, Burton, Speke, Grant, Baker, Stanley, etc. East Africa Protectorate is divided into seven provinces: Ukamba, Seyidie, Tanaland, Jubaland, Kenia, Naivasha, Nyanza, and some unorganized terr. in N.; administered by governor and executive and legislative councils. Area, 246,822 sq. m.; pop. c. 2,800,000 (including 5,400 Europeans and Eurasians and 17,000 Asiatics).

Uganda (1° N., 33° E.), bounded N. by Egyptian Sudan, E. by E. Africa Protectorate, W. by Congo State, S. by former German E. Africa and Lake Victoria Nyanza. It is divided into five provinces: Buganda with islands in Lake Victoria, the Eastern, Northern, Western, and Rudolf Provinces, each divide into several districts; Uganda is traversed by high volcanic mountain ranges; Ruwenzori Range in W., with glaciers and snowfields, highest peak, Mt. Stanley (16,816 ft.); Mt. Elgon (14,152

ft.) on border of Eastern Province, Mt. Debasien in Eastern Province, Mt. Agoro in Northern Province, etc. Principal river is Nile. Uganda contains part of Lakes Rudolf, Albert, Edward, Victoria, and the whole of Lakes George, Kioga, Salisbury. Soil is fertile except in Rudolf Province, which is hot and very dry; luxuriant tropical vegetation; extensive forests; marshy tracts in Eastern Province. Climate is healthy in parts; sleeping-sickness prevalent in the Victoria Lake region, owing to tsetse fly. Fauna includes giraffe, elephant, okapi, chimpanzee, buffalo, zebra, rhinoceros, hippopotamus, and antelope. Chief products are cotton, rubber, ivory, timber, gum, hides, sugar, ground-nuts, chillies, coffee, cocoa, vanilla, cattle, sheep. Iron ore, copper, and gold are found. Chief towns are Entebbe (Brit. headquarters), Mengo (the native cap. of Uganda), Jinja. Native tribes include Baganda (civilized and intelligent), Banyora, Bari, Madi, Tesi, and pygmies known as Bambuti or Bakwa. Missionaries established stations (1877-99), which progressed favorably under the reign of King Mtesa. His son, Mwanga, who succeeded him in 1884, persecuted Christians, and caused the murder of Bishop Hannington (1885). The authority of Brit. E. Africa Co. was recognized (1890) by agreement between Captain Lugard and Mwanga; Uganda became a Brit. Protectorate (1894); explored by Speke and Grant (1862), Baker (1864), Stanley (1875), and others. 'Uganda Railway,' through E. Africa Protectorate, does not enter Uganda, but reaching Victoria Nyanza gives Uganda an outlet to the coast. Railways run between Jinja and Namasagali on Nile, and between Port Bell and Kampala. Steamers ply on Lakes Victoria and Albert Nyanza. Uganda is administered by a governor. There are several Prot. and R.C. schools and many missionary societies. Area, 109,119 sq. m.; native pop. c. 3,358,000, and 570 Europeans. See MAP AFRICA. Zanzibar Protectorate. See ZANZIBAR.

BRITISH EMPIRE, the unofficial but popular and convenient term for the aggregation of territory under the Brit. crown. The title of the Brit. sovereign is 'George V., by the grace of God of the United Kingdom of Great Britain and Ireland, and of the Brit. Dominions beyond the Seas, King, Defender of the Faith, Emperor of India.' The various colonies, possessions, protectorates, etc., which comprise the empire are indicated in the accompanying table. The following ex-German colonies are held by mandate from the League of Nations: Togo and Kamerun

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purposes. Sun-baked bricks were in use amongst the anc. Egyptians, Assyrians, and Babylonians, and some of these are still to be seen in a perfect state of preservation. Kiln-baked bricks, however, mixed with chopped seeds or straw, were also employed in very early times by these peoples. They were also largely used by the Romans, and by them were introduced into England. After the withdrawal of the Romans brickmaking fell into disuse in England until the craft was reintroduced by the Flemings in the 13th cent. But it was not until the 15th cent. that bricks came again into any general use. The manufacture of brick forms one of the most important divisions of the clay-working industry in the United States. Some of the best clays in the world are found in various places in New York and along the Hudson in New York State. The production of common brick in the United States is valued at over \$40,000,000 annually, and fire brick at nearly \$70,000,000. These are the two principal kinds of brick used in building.

BRIDE, a newly married woman. The origin of 'bride-cake' dates back to the days of ancient Rome when part of the marriage ceremony consisted of the bridal pair eating of a cake made of salt, flour, and water. Later it became customary to shower grains of wheat over the bride; subsequently small cakes were flung at the bride, and by such developments we have reached the pre-tentious sugared confections of the present day.

BRIDEWELL, district, S. of Fleet Street, London; celebrated prison demolished, 1864.

BRIDGE, card game, a development of whist, variously reputed to be of Dutch, Russ., or Turk. origin. Introduced into Britain first at the Portland Club in 1894, it has since increased enormously in popularity. Four persons take part in the game, two being partners against the other two, an ordinary pack of cards being used. The dealer decides trumps ('no trumps' is a possible declaration) after the players have examined the cards, or he may leave the declaration to his partner, who *must* then declare. This partner does not play his hand, which is exposed on the table as a 'dummy' hand, and played, in addition to his own, by the dealer. The strength of the cards in making tricks, and the general scheme of play, is the same as in whist.

The value of each trick won, over six depends on the trumps declared, and is: in no trumps 12, hearts 8, diamonds 6, clubs 4, spades 2. After the declaration

of trumps the opponents may double the value of the tricks, when the first pair may redouble, and so on. The partners who first score 30 points win a *game*, and those who first win two games win a *rubber*, a rubber counting 100. If one side wins all the tricks it scores 40 points, *grand slam*; if it wins 12 tricks, 20 points, *little slam*. Points are also given for 'honors,' which are ace, king, queen, knave, ten, in a suit declaration, and for *chicane*, the case when a player has no trump card in his hand; for honors the scoring is somewhat more complicated. The total score of each side includes the points for tricks, rubbers, honors, grand slam, etc., all added together.

BRIDGE, SIR CYPRIAN ARTHUR GEORGE (1839), Brit. admiral; served in the Crimean War, Indian Mutiny, and on Burmese frontier; commander-in-chief on Australian station (1895 - 8), China station (1901-4); inquired into Dogger Bank incident (Oct. 1904); has written on naval warfare, sea power, and pub. *Some Recollections*, 1918; one of commissioners to inquire into the conduct of the Mesopotamian campaign.

BRIDGE, SIR FREDERICK (1844), English musician and author; b. Oldbury, Worcestershire. He was educated at the Cathedral School, Rochester, and in 1850 became organist of Rochester Cathedral where he remained nine years. He was organist of Trinity Church, Windsor (1865-69), and of Manchester Cathedral (1869-75). From 1896 to 1922 he was conductor of the Royal Choral Society. Knighthood was conferred on him in 1907. He has written many cantatas, symphonies and oratorios and in addition has published *Samuel Pepys, Lover of Music*, 1904; *A Westminster Pilgrim*, 1919; and *The Old Cryes of London*, 1921.

BRIDGE OF SIGHS. See **VENICE**.

BRIDGEHEAD, fortification, either temporary or permanent, protecting exit from a bridge on farther bank; example, Rhine fortresses; must secure space sufficient for deployment of fighting forces after crossing bridge; Fr. *tête de pont*; in open warfare term often applied to ground held by force on enemy's side of river crossing to cover deployment of troops on farther bank.

BRIDGEPORT, a city of Connecticut, the county seat of Fairfield co. It is on the Long Island Sound, on the New York New Haven and Hartford Railroad, and at the mouth of the Pequonnock River. 18 miles southwest of New Haven. The city occupies both sides of the river which is spanned by bridges. The west-

ern part rises to an elevation of about 70 feet above high water and is known as Golden Hill. Here are many of the finest residences of the city. There are many public parks, the most attractive of which is Seaside Park. This has a short sea wall and a picturesque drive. It contains a Soldiers' Monument and the statue of Elias Howe, inventor of the sewing machine. B. is one of the most industrial cities in the country and it was especially prosperous during the war when many of the large plants making munitions and other war materials were greatly enlarged. Among the important interests are the Singer Sewing Machine Company, the Union Metallic Cartridge Works, the Remington Arms Company, the General Electric Company, and the Cram Company. In addition there are manufactures of carriages, furniture, bicycles, typewriters and cutlery. The public buildings include a U.S. Government building, county courthouse, Barnum Memorial Institute, and many hospitals and asylums. There are several banks and newspapers. Bridgeport was settled in 1670 under the name of Fairfield, and was incorporated as a city in 1836. Pop. 1920, 143,152.

BRIDGES. Elevated structures erected across a gap between other structures or between points of land separated by water or depressions in the earth. Many of these necessary erections raised across rivers for pedestrian, wheel and railroad traffic are remarkable for the engineering skill developed in their construction and the architectural beauty of their designs. Bridges are great landmarks of cities and sections. New York, London, Paris and Berlin have river structures so characteristic in their commanding strength and design that they loom as outstanding facts of each city. The same may be said of all towns whose means of communication are augmented by the genius of the builder of bridges.

The modern bridge is constructed of stone, concrete or steel arches, or embody types of steel structures known as simple truss, continuous, cantilever, suspension, and high viaduct bridges. Among those of steel arches, a representative erection is that at Hell Gate, N. Y. Metropolis, Ill., has a typical simple truss bridge. At Sciotsville, Ohio, is a notable example of the continuous bridge, which crosses the Ohio river over two spans each 775 feet long. Suspension bridges have impressive representatives in two erected over the East River, at New York City, namely, the Williamsburg and Brooklyn bridges. Lethbridge, Canada, has a high viaduct bridge rising 5,327 feet on a span of 314 feet.

Bridge construction clung to old methods until some 160 years ago, about the time when industrial development began to provide better and cheaper materials and stimulate progress in engineering science and technology. The growth of railroads also stood out as a leading influence in the building of bridges as they are today. Of all present types the truss bridge is wholly new and its use has largely affected other types. The truss displaced the beam; it is a mainstay in arched bridges and also figures as supports of suspension bridges built to bear modern traffic. The truss structure of a bridge comprises a network of more or less slender bars linked up in a triangular cross work. They were first built of wrought iron (about 1850). Previously the truss features frequently formed a combination of both iron and timber. There would be timber struts and iron tension rods; then came iron rolled beams and plate girders for short spans, and truss bridges with cast iron struts and wrought iron tie rods for longer spans. Wrought-iron bridge construction only developed, both as to trusses and plate girders, largely affecting the use of time-honored wood and stone arches, except for minor bridge work. Soft steel, nickel steel and silicon steel in turn displaced wrought iron in bridge building. The production of Portland cement provided another serviceable material, but for a long time stone arches remained in favor despite its growing use. Cement concrete finally (about 1890) came into use for arches. It was followed by reinforced concrete, that is, concrete in which steel rods are embedded in the required directions to provide tensile strength—for beam and arch construction, in which this material is now extensively used, especially for city bridges and those on leading country roads, as well as for railways. A remarkable example of concrete bridge work is the Tunkhannock Viaduct of the Delaware, Lackawanna and Western Railroad in Pennsylvania, believed to contain a greater volume of concrete than any other bridge of its kind.

Bridge engineers have achieved great feats with various types of suspension and cantilever bridges calling for long spans. Their enterprise and ingenuity have been largely due to improved processes of metal manufacture, which greatly increased the tensile strength of wrought iron and steel. As bridge materials, wrought iron and soft steel are of high strength in both tension and compression (50,000 to 70,000 pounds to the square inch). Being also malleable and tough, holes can be punched in them and pieces bent. Safe stresses are 15,000 to 20,000 pounds. Other steel

of high strength, like nickel steel, can be stressed to 20,000 to 30,000 pounds to the square inch. Cast iron, being brittle and liable to cracks and internal defects, is not now used in bridgework except for such parts as bearing blocks. In tension is it only about twice as strong as wood, which can be stressed to about 10,000 pounds to the square inch, but cast iron is very strong in compression—about 100,000 pounds to the square inch. Bridges must be made strong enough to withstand the forces brought to bear on them. They must bear their own weight, or the stresses of its dead load; then the traffic moving over them, or the live or moving load, and the impact and vibration produced therefrom. Wind pressure is quite a serious burden, not to mention the momentum of a stopping train.

Railroads have produced most modern bridges. On American lines they number some 80,000. Most of them are built of steel, with trusses or plate girders designed to sustain uniform loads ranging from 3,000 to 4,800 pounds per linear foot of track, according to the length of span and the service required.

Highway bridges bear loads of from 1,000 to 1,800 pounds per linear foot of track and are constructed of wood, metal, masonry or concrete. Over rivers in some parts of the country are moveable bridges or drawbridges to permit of a clear passage way for vessels. These are known as swing, rolling or lift bridges, swing bridges being those most commonly used. Here and there are pontoon bridges, a development of the ancient bridge of boats. The longest one is a railroad structure running across the Mississippi river at Prairie du Chien, Wis.

Bridges of enduring material live long when well built and maintained. Steel bridges, however, must be regarded as temporary, with a life limited to the crystallization of their metal. Stone bridges, despite being subject to deterioration of mortar joints, have lasted for hundreds and even thousands of years, given good foundations. Modern bridges tend to deteriorate from obsolescence due to increase of traffic loads or other causes before their limit of life has been indicated.

BRIDGES, ROBERT (1844); poet laureate since 1913; formerly physician, and practised at various London hospitals; retired 1882; has published many volumes of plays in experimental meters, narrative poems and lyrics; *Poetical Works*, 1898-1905; *The Spirit of Man*, an anthology in English and French, 1916; and *October and other Poems*, 1920.

BRIDGES, ROBERT (1858); pseudo-

nym 'Droch,' American author and poet; b. Shippensburg, Pa. He graduated at Princeton and for some time was connected with the New York Evening Post. In 1887 he became assistant editor of Scribner's Magazine. He wrote extensively and acceptably for magazines, and his reviews for *Life* over the signature 'Droch' added materially to his reputation, because of their humor and originality. Among his publications may be cited *Overheard in Arcady*, 1894; *Suppressed Chapters and Other Bookishness*, 1895; and *The Roosevelt Book*, 1904.

BRIDGET, ST. (1302-73); founded *Bridgettines* (Augustinian Order) in Sweden; lived in Rome from 1350. St. Bridget, or St. Bride, popular Irish saint of V. cent.

BRIDGETON, a city of New Jersey, the county seat of Cumberland co. It is on the Cohancy River and on several railroads, 38 miles south of Philadelphia. Bridgeton is an old community and before the Revolutionary War was of considerable importance. It is the center of a large agricultural community. Its industries also are important and include the manufacture of glass, gas pipe, nails, machinery, woolen goods, etc. There is a beautiful park which contains a lake and an athletic field. There are several private educational institutions and an excellent public high school. The city is a popular summer resort. Pop. 1920, 14,323.

BRIDGETOWN (13° 9' N.; 59° 85' W.), port, Barbados; trading center; seat of bishopric. Pop. 17,000.

BRIDGEWATER, a town in Massachusetts, in Plymouth co. It is on the New York, New Haven and Hartford Railroad, and is 27 miles south of Boston. The town includes 5 villages. It is the site of the State Normal School, the State Farm, and the State Almshouse. There is a public library, a savings bank, and manufactures of iron, boots, shoes, etc. Pop. 1920, 8,438.

BRIDGMAN, FREDERIC ARTHUR (1847), American painter; b. Tuskogee, Ala. His early studies were pursued at the Brooklyn Art School and the New York Academy of Design. In 1866 he went to Paris and entered l'Ecole des Beaux-Arts where he came under the influence of Gerome that revealed itself later in his works. He exhibited with great success in Paris and New York and won honors from foreign governments. Some of his most noted paintings are *An American Circus in Normandy*; *L'Arabe*; *The Destruction of Pharaoh's Hosts*; *Procession in Honor*

BRIDGMAN

of *Isis* and *The Greek Girl*. In addition to his art work, he has composed symphonies and other orchestral works.

BRIDGMAN, LAURA DEWEY (1829-89), Amer. deaf-mute; was also blind. Carefully taught in blind asylum of Boston, her mind developed in spite of her affliction. Her own impressions and the observations made by her instructors, have proved of great service to the teachers of deaf-mutes and the blind.

BRIDGWATER (51° 8' N., 3° 7' W.), town, on Parrot, Somersetshire, England; bath-bricks. Pop. 17,000.

BRIDLINGTON, BURLINGTON (54° 6' N., 0° 12' W.), watering-place, East Riding, Yorkshire, England; remains of XIII.-cent. priory; fine bay and harbor; chalybeate mineral spring. Pop. 15,000.

BRIE (48° 44' N., 3° E.), small district, France; E. of Paris; corn, cheese.

BRIEF.—(1) A brief (in law) is an epitome or abridged statement of a client's case for the instruction of counsel, with a reference to the points of law supposed to be applicable to the case. (2) Papal briefs were sent by the Pope to individuals or religious communities, relating to matters of privilege or discipline. (3) Church briefs were letters sent out in the king's name, after the Reformation, to abb's, bp's, the clergy, and magistrates, licensing them to collect money for church building and similar objects. Since 1853 such briefs have been in abeyance.

BRIEG (50° 51' N., 17° 29' E.), town, on Oder, Prussian Silesia. Pop. 26,000.

BRIENNE, JOHN OF (1237), Fr. noble who became king of Jerusalem by marrying (1210) its queen, Marie de Montferrat; regent for their dau., Yolanda or Isabel, 1212; elected Byzantine emperor, 1229.

BRIENNE - LE - CHÂTEAU (48° 22' N., 4° 33' E.), town, Aube, France; here Napoleon studied at military school, 1779-84; and defeated Allies, 1814.

BRIENZ (46° 45' N., 8° E.), town and lake, in canton Bern, Switzerland; tourist resort.

BRIERLEY HILL (52° 30' N., 2° 10' W.), town, Staffordshire, England; coal, iron, fire-clay. Pop. 13,000.

BRIEUX, EUGÈNE (1858), Fr. dramatist, whose plays deal mainly with social abuses and sexual problems; member of Fr. Academy. Bernard Shaw's *Three Plays by Brieux*, 1916; contain *La Femme Seule*, *La Robe Rouge* and *Les Remplacantes*. *Les Avaries* ('Damaged Goods').

BRIGHTON

BRIGGS, CHARLES AUGUSTUS (1841-1913), Amer. theologian and Old Testament scholar.

BRIGGS, FRANK OBADIAH (1851-1913), American legislator; b. Concord, N. H. He entered military life and graduated from the United States Military Academy in 1872, resigning however from the army in 1877 to take a position with the Roebling Co. of Trenton, N. J., where he became assistant treasurer. He had a marked predilection for politics and was elected Mayor of Trenton on the Republican ticket, 1899-1902; State Treasurer of New Jersey, 1902-07; and United States Senator, 1907-13. From 1904 to 1913 he was chairman of the Republican State Committee of New Jersey.

BRIGHAM, a city of Utah in Box Elder co. It is on the southern Pacific and the Oregon Shortline Railroads. The city is the center of an important fruit growing and agricultural community. Its industries include canning and cement factories, planing mills and a lumber yard. There is a public library and other public buildings. Pop. 1920, 5,282.

BRIGHOUSE (53° 43' N., 1° 46' W.), town, W. Riding, Yorkshire, England; woolen factories. Pop. 22,000.

BRIGHT, JOHN (1811-89), Brit. statesman and manufacturer; b. Rochdale; s. of a Quaker cotton manufacturer; ed. at a Friends' School at Ackworth and afterwards at York and Newton. He entered Parliament (1843), already famous as an orator. In 1847 he was a member for Manchester and advocated Free Trade, electoral reform, and religious freedom. He opposed the Crimean War (1854). President of Board of Trade (1868), supported disestablishment of Irish Church (1869), and Irish Land Act (1870), and became Chancellor of Duchy of Lancaster (1873). Unable to support Government's Egyptian policy, he retired (1882), and strenuously opposed Gladstonian Home Rule Bill (1886). He was Lord Rector of Glasgow Univ. (1880).

BRIGHT, RICHARD. See **BRIGHT'S DISEASE**.

BRIGHTON (50° 49' N., 0° 8' W.); town, on Eng. Channel, Sussex; fishing village, XVIII. cent., now fashionable holiday resort; mild climate; magnificent promenade extending over 3 miles; splendid buildings; educational center; 'Pavilion' originally built as residence of George IV.; aquarium. Pop. 1921, 142,427.

BRIGHTON (37° 57' S., 145° 1' E.);

watering-place, Victoria, Australia. Pop. 10,500.

BRIGHT'S DISEASE, inflammation of kidneys, named after the first describer, Richard Bright (1789-1858). It is characterized especially by changes in the urine, and by dropsy, first noticeable in the face, and a pasty color of the skin. The onset is usually sudden, the first symptoms being chilliness, pains in the back, vomiting, and slight rise of temperature; an attack usually lasts four or five weeks, and may go on to the chronic form. The urine is scanty, of high specific gravity, turbid, and contains blood corpuscles, hyaline, epithelial and blood casts, and much *albumen*. The attack usually follows an acute specific fever (especially scarlet fever) or a chill. The treatment is to diminish the proteids in nourishment in order to rest the kidneys, give water and other diluents, and increase the action of the skin and bowels; tonics are given during convalescence.

BRILLAT-SAVARIN, ANTHELME, a French gastronomist, b. in 1755 at Belley. In 1793 he became mayor of Belley. To escape proscription he fled from France to Switzerland, and subsequently to America, where he played in the orchestra of a New York theatre. He returned to France on the fall of Robespierre and pub. his famous *Physiologie du Gout*, a witty compendium on the art of dining. Many editions and translations of the work have been published.

BRIMSTONE. See **SULPHUR**.

BRINDABAN (27° 33' N., 77° 44' E.), town, Muttra district, United Provinces, India; holy city of Hindus, and place of pilgrimage. Pop. 23,000.

BRINDISI (40° 40' N., 18° 1' E.), seaport town, S. Italy, on Adriatic; archiepiscopal see; important station for passengers and mails to and from the East; ancient *Brundisium*; besieged by Cæsar, 49 B.C.; wine and oil exported. Pop. 30,000.

BRINTON, DANIEL GARRISON (1837-99), American archaeologist and ethnologist, b. at Thornbury, Penn.; graduated at Yale and studied medicine in Paris and Heidelberg. Acted as surgeon in the Union army during the Civil War. Was appointed professor of American linguistics and archaeology at University of Pennsylvania in 1886, a post which he held until his death. Among his works are: *The Myths of the New World*, 1868; *American Hero Myths*, 1882; *The American Race*, 1891; *Library of American Aboriginal Literature* (8 vols.), 1882-90.

BRINVILLIERS, MARIE MADELINE MARGUERITE D'AUBRAY, MARQUISE DE (c.1630-76), infamous Fr. poisoner; beheaded and her body burned (Paris, July 16, 1676).

BRISBANE (27° 28' S., 153° 2' E.), town, Australia; capital of Queensland, on river B., 25 miles from sea; extensive wharf accommodation, dry-docks; chief trading center of colony; port of call, seat of Catholic abp. and Anglican bp.; North and South B. connected by bridge; founded as convict station, 1825; made free settlement, 1842; exports wool, gold, hides. Pop. 1921, 209,699.

BRISBANE, ARTHUR (1864); Amer. editor; b. Buffalo, N. Y. He received a public school education and later spent five years abroad, chiefly in France and Germany. He became a reporter on the New York Sun in 1882 and later served that paper as London correspondent. He edited the Evening Sun for a time and for seven years was on the editorial staff of the Evening World. It was not, however, until he became connected with the Hearst newspapers as editor of the Evening Journal that he established a world-wide reputation as one of the ablest if not the ablest newspaper editor in the United States. The simplicity and clearness of his style, the brevity and incisiveness of his writings, his mastery of satire, combined with the fullness of his information, has given him a power and influence not surpassed by any editor of his time. He took the popular side on most questions and his writings were tinged with radicalism. He did effective work in exposing and scourging corrupt practices in business and politics, but he has also aroused antagonism at times by groundless accusations and unjustified attacks. He has lectured at the Columbia School of Journalism and has published Editorials From the Hearst Papers and *Mary Baker Eddy*, 1908. In 1917 he purchased the Washington Times, and in 1918 the Evening Wisconsin, both of which were later included in the Hearst system. Since 1918 he has been editor of the Chicago Herald and Examiner.

BRISBANE, SIR THOMAS MACDOUGALL (1773-1860), Scot. general and scientist; gov. of New S. Wales; gave name to Brisbane, Queensland; made list of stars.

BRISSON, EUGÈNE HENRI (1835-1912). Fr. Radical statesman; prime minister (1885-1898); president of the Chamber (1894-98, 1906); exposed Panama scandals, and insisted on revision of Dreyfus case.

BRISSET, JACQUES PIERRE (1754-93), Fr. revolutionary; edit. *Patriote francais*, 1789-93; orator of Jacobin Club etc. Girondists were also called *Brissetins*.

BRISTED, CHARLES ASTOR (1820-74), American author; b. New York City. He graduated at Yale in 1839, following which date he spent five years in post-graduate studies at Cambridge University, England, where he won distinction and carried off many prizes in literary competitions. Under the pseudonym of 'Carl Benson' he contributed to many English and American magazines, his writings being noted for their clearness, interest and flawless style. His publications include *Selections from Catullus*, 1849; *The Upper Ten Thousand*, 1852; *Pieces of a Broken-Down Critic*, 1857; and *The Interference Theory of Government*, 1867.

BRISTOL (51° 28' N., 2° 35' W.), city, England; in Gloucestershire and Somersetshire, at junction of Frome and Avon; important port, has good dock accommodation; large trade with U.S.A., Canada, Indies, and other parts of empire; exports coal, salt, tin-plates, machinery, cottons, chemical products, etc.; imports provisions, timber, grain, oils, marbles, ores, etc. In district are traces of Rom. and Brit. camps; while under Dan. rule, noted as slave market; surrendered to William the Conqueror, after which it was fortified; scene of rising against Edward II. in 1313; supported Parliament in Civil War; suffered three sieges; scene of riots at various dates in XVIII. cent. and during Reform Agitation, 1831. Pop. 1921, 377,061.

BRISTOL, a town in Connecticut, in Hartford co. It is on the New York, New Haven and Hartford Railroads, 17 miles west of Hartford. Its industries include the manufacture of clocks, brass goods, tools, bicycles, bells, etc. There is an excellent public library. Pop. 1920, 20,620.

BRISTOL, a borough of Pennsylvania, in Bucks co. It is on the Pennsylvania Railroad and the Delaware River, 21 miles northeast of Philadelphia. It is an important manufacturing city and its industries include the making of carpets, hosiery, and foundry products. It is also the center of a rich truck farming region and has considerable trade in these products. Pop. 1920, 10,273.

BRISTOL, a town of Rhode Island, the county seat of Bristol co. It is a port of entry and is on Narragansett Bay and on the New York, New Haven and Hartford Railroad, 15 miles south-

east of Providence. There is an excellent harbor which gives facilities for passenger and freight service for Fall River and Providence. Bristol is the seat of the Herreshoff shipyards, where many famous ships and yachts have been constructed. Here many torpedo boats were built during the World War. The town is the center of an important market gardening community and its manufactures include the making of rubber, woolen and cotton goods, etc. Bristol was the seat of King Philip, the great Narragansett Indian chief. Pop. 1920, 11,375.

BRISTOL, a city in Sullivan co., Tennessee, and Washington co., Virginia. It is on several important railroads and is 130 miles east of Knoxville. The boundary line between the two States runs along the main street of the city, east and west. There are several important educational institutions including Kings College and Southwest Institute for Young Women. Its industries include the manufacture of tobacco, cotton, woolen goods, leather, etc. Pop. 1920, with the Virginia section of city, 14,176.

BRISTOL CHANNEL (51° 20' N.; 4° 30' W.), inlet of Atlantic between S. Wales and S. W. counties of England.

BRISTOL, FRANK MILTON (1851), American Methodist Episcopal bishop; b. Orleans, co., N. Y. He held important pastorates at Trinity Church, Chicago; First Church, Evanston, Ill., and Metropolitan Church, Washington, D. C. His wide culture and unusual eloquence gave him a national reputation, and his services as a lecturer were in great demand. In 1908 he was elected bishop. Among his more notable publications are *Addresses*, *Shakespeare and America*, *Providential Epochs* and *The Ministry of Art*.

BRISTOL, MARK LAMBERT (1868), American naval officer; b. Glassboro, N. J. He graduated from the United States Naval Academy, 1887; entered the navy as an ensign in 1889 and advanced through the various grades of the service, reaching the rank of captain in 1913. He served on the battleship Texas at the battle of Santiago in the Spanish-American war, and commanded the Oklahoma in European waters during the World War. He was appointed High Commissioner to Turkey in 1920.

BRISTOW, BENJAMIN HELM (1832-96), Amer. soldier, lawyer, and statesman; Solicitor-General (1870-72); Sec. of the Treasury (1874-76); ended scandals of 'Whisky Ring.'

BRISTOW, JOSEPH LITTLE (1859), American editor and legislator; b. Flemingsburg, Ky. He was editor of the *Salina* (Kan.) Republican and active in politics. In 1898 he was appointed fourth assistant Postmaster-General and in 1900 sprang into nationwide prominence by exposing frauds in the Post-Office Department. Later he reorganized the Cuban postal service. In 1905 President Roosevelt made him special commissioner to the Panama Railroad. He was elected to the United States Senate in 1909 and in 1912 when the split in the Republican party occurred was an ardent supporter of the Progressive movement. In 1915 he was made Chairman of the Kansas Utilities Commission.

BRITAIN (Lat. *Britannia*), Rom. name for island constituted by England and Scotland; now whole territory of Brit. Isles (q.v.).

BRITANNIA, Lat. form of Britain and its personification in female figure on coins, etc. *Rule B.*, written by Thomson (q.v.), is patriotic Brit. anthem.

BRITANNICUS (c. 41-55), s. of Rom. Emperor Claudius; suffered death by poisoning.

BRITISH ASSOCIATION, Imperial society, founded at York, 1831, by Sir D. Brewster for promoting scientific research; meets annually, occasionally in the colonies.

BRITISH CENTRAL AFRICA. Until 1907 what is now officially known as Nyasaland Protectorate was called 'British Central Africa.' The latter term is now commonly used to denote all Brit. territory in Central Africa (as distinguished from Brit. East, Brit. West, and Brit. South Africa)—*viz.*, Nyasaland and that part of Rhodesia N. of the Zambezi.

Nyasaland (9° 30'-17° S.; 33°-36° E.), Brit. protectorate; bounded on N. by E. Africa; E. and S. by Port E. Africa; W. by N. Rhodesia; area, 39,315 sq. m. Surface is mostly lofty plateau over 3,000 ft. above sea-level; numerous streams flow into Lake Nyasa, which drains by Shire R. into Zambezi. From Blantyre (chief town), in Shire 'Highland,' railway (113 m.) runs to Port Herald on Port. border, where there is steamer service to Chinde on coast by Shire and Zambezi. Stevenson's Road connects Lakes Nyasa and Tanganyika. First explored by Portuguese, Nyasaland was later and more thoroughly mapped by Livingstone; British Central Africa Protectorate established (1892); proclaimed Nyasaland Protectorate (1907).

Nyasaland is administered by gover-

nor, assisted by executive and legislative councils and district residents; seat of administration is Zomba. Pop. (largely concentrated in healthy Shire Highlands) consists of 1,137,300 natives, 700 whites, and 400 Asiatics; missionary center; sleeping-sickness in parts. Chief exports are tobacco, cotton, tea, rubber, beeswax, coffee; imports include textiles, machinery, tools, food-stuffs, and hardware. See MAP AFRICA.

BRITISH COLUMBIA, prov.; Dominion of Canada (49°-60° N., 114°-141° W.); between Rocky Mts. and Pacific; include Vancouver and Queen Charlotte Islands. The surface is very mountainous, the Rockies reaching a height of 13,068 ft. in Mount Robson. To the W. of the Rockies are the Sulkirk and Gold Ranges, which rise to 11,000 ft.; Cascade or Coast Range, rising to 10,000 ft. Chief rivers are the Columbia, Fraser, Thomson, Peace. Climate varies; mild near coast, dry and hot in S. interior, severe winters in N.; heavily wooded; important commercial trees are Douglas fir, maple, yellow cypress, red and yellow cedar, white spruce; much pastoral and agricultural land. Chief industries are lumbering, mining, fruit growing, ranching, fishing, canning fur sealing; very rich in minerals; gold is worked in the Yukon valley and at Cariboo and Cootenay; coal, silver, lead, copper, are also mined; the working of cinabar, platinum, gypsum, asbestos, plumbago, has begun. Cap., Victoria, is situated in Vancouver I.; other towns, Vancouver and New Westminster on mainland; univ. of prov., Vancouver (1913); railways being greatly extended. Administration is carried out by lieutenant-governor, assisted by executive council and legislative assembly; represented in Federal Parliament by three senators and seven members of lower house. Brit. Columbia became a Brit. colony (1858); united with Vancouver (1866); admitted into Dominion of Canada (1871); Alaska boundary with U.S. settled (1903). Area, 383,000 sq. m.; pop. 392,500. See MAP CANADA.

BRITISH EAST AFRICA, Brit. terr. in E. Central Africa, comprising (1) E. Africa Protectorate, (2) Uganda Protectorate (3) Zanzibar Protectorate, known after June 23, 1920, as Kenya Colony. For the former territory of Ger. East Africa, see under EAST AFRICA.

East Africa Protectorate (1° N.; 39° E.), bounded by Abyssinia (N.), Uganda Protectorate (W.), former Ger. E. Africa (S.), Ind. Ocean and Italian Somaliland (E.); seaboard about 400 m.; coastal strip from former Ger.

frontier to Kipini, Lamu Archipelago, and Kismayu, near Juba, are leased from Sultan of Zanzibar. Coast regions are flat and unhealthy; parts of interior healthier; traversed by volcanic mountain ranges; highest peak, Mt. Kenia (17,000 ft.). Chief rivers are Juba, Tana, Sabaki; principal lakes, Sugota, Naivasha, Baringo, and part of Rudolf and Victoria Nyanza.

In interior are valuable forests and fine pasture lands; southern and north-eastern districts fertile. Principal products are maize, rice, coco-nuts, hemp, coffee, wheat, valuable timber, ostriches, sheep; exports ivory, rubber, hides, skins, cotton, copra, tobacco. Mineral resources as yet unimportant. Country gives promise of great developments. Mombasa-Victoria (Uganda) State Ry. (618 m.) was completed in 1902; steamers on Lake Victoria Nyanza; cable between Zanzibar and Mombasa. Coast is inhabited by Swahilis and Arabs; Somalis, Gallas, Bantu, etc., inland. Paganism predominates, but Mohammedanism is spreading rapidly, especially on coast. Principal towns are Nairobi (cap.), Mombasa (chief port), Lamu, Kismayu, Malindi (ports), Kisumu, Nyeri. Portuguese arrived in 15th cent. and built forts at Mombasa, Lamu, and Malindi; terr. conquered by the Imam of Muscat (1698); Germans acquired a protectorate over Witu (1884); Brit. E. Africa Co. assumed control over Sultan of Zanzibar's mainland possessions (1888); boundary agreements made between Germany and Britain (1886, 1890), Britain and Italy (1891), Britain and Congo Free State (1894); protectorate of Great Britain accepted by sultan (1890); administration taken over by Foreign Office (1895), by Colonial Office (1905); explored by Krapf, Burton, Speke, Grant, Baker, Stanley, etc. East Africa Protectorate is divided into seven provinces: Ukamba, Seyidie, Tanaland, Jubaland, Kenia, Naivasha, Nyanza, and some unorganized terr. in N.; administered by governor and executive and legislative councils. Area, 246,822 sq. m.; pop. c. 2,800,000 (including 5,400 Europeans and Eurasians and 17,000 Asiatics).

Uganda (1° N., 33° E.), bounded N. by Egyptian Sudan, E. by E. Africa Protectorate, W. by Congo State, S. by former German E. Africa and Lake Victoria Nyanza. It is divided into five provinces: Buganda with islands in Lake Victoria, the Eastern, Northern, Western, and Rudolf Provinces, each divide into several districts; Uganda is traversed by high volcanic mountain ranges; Ruwenzori Range in W., with glaciers and snowfields, highest peak, Mt. Stanley (16,816 ft.); Mt. Elgon (14,152

ft.) on border of Eastern Province, Mt. Debasien in Eastern Province, Mt. Agoro in Northern Province, etc. Principal river is Nile. Uganda contains part of Lakes Rudolf, Albert, Edward, Victoria, and the whole of Lakes George, Kioga, Salisbury. Soil is fertile except in Rudolf Province, which is hot and very dry; luxuriant tropical vegetation; extensive forests; marshy tracts in Eastern Province. Climate is healthy in parts; sleeping-sickness prevalent in the Victoria Lake region, owing to tsetse fly. Fauna includes giraffe, elephant, okapi, chimpanzee, buffalo, zebra, rhinoceros, hippopotamus, and antelope. Chief products are cotton, rubber, ivory, timber, gum, hides, sugar, ground-nuts, chillies, coffee, cocoa, vanilla, cattle, sheep. Iron ore, copper, and gold are found. Chief towns are Entebbe (Brit. headquarters), Mengo (the native cap. of Uganda), Jinja. Native tribes include Baganda (civilized and intelligent), Banyora, Bari, Madi, Tesl, and pygmies known as Bambuta or Bakwa. Missionaries established stations (1877-99), which progressed favorably under the reign of King Mtesa. His son, Mwanga, who succeeded him in 1884, persecuted Christians, and caused the murder of Bishop Hannington (1885). The authority of Brit. E. Africa Co. was recognized (1890) by agreement between Captain Lugard and Mwanga; Uganda became a Brit. Protectorate (1894); explored by Speke and Grant (1862), Baker (1864), Stanley (1875), and others. 'Uganda Railway,' through E. Africa Protectorate, does not enter Uganda, but reaching Victoria Nyanza gives Uganda an outlet to the coast. Railways run between Jinja and Namasagali on Nile, and between Port Bell and Kampala. Steamers ply on Lakes Victoria and Albert Nyanza. Uganda is administered by a governor. There are several Prot. and R.C. schools and many missionary societies. Area, 109,119 sq. m.; native pop. c. 3,358,000, and 570 Europeans. See MAP AFRICA.

Zanzibar Protectorate. See ZANZIBAR.

BRITISH EMPIRE, the unofficial but popular and convenient term for the aggregation of territory under the Brit. crown. The title of the Brit. sovereign is 'George V., by the grace of God of the United Kingdom of Great Britain and Ireland, and of the Brit. Dominions beyond the Seas, King, Defender of the Faith, Emperor of India.' The various colonies, possessions, protectorates, etc., which comprise the empire are indicated in the accompanying table. The following ex-German colonies are held by mandate from the League of Nations: Togo and Kamerun

(shared with France); Ger. E. Africa (shared with Belgium); island of Nauru (S. Pacific); Ger. S.W. Africa (held by Union of S. Africa); Ger. Samoan Islands (held by New Zealand); all Ger. possessions S. of equator except those mentioned above (held by Commonwealth of Australia). Many of the Brit. states have responsible government, and a parliamentary system approximating closely to that of the mother country. All legislative Acts of these local parliaments require the royal assent (given through a governor or gov.-gen. nominated by and acting for the crown.) Every colonial subject enjoys Brit. citizenship, and the right of ultimate appeal to the judicial committee of the Privy Council. Each self-governing colony is an *imperium in imperio*, and may be regarded as a nation intensely conscious of its nationality, especially since the participation of the Dominions in the World War. (For the movement towards closer union, see **IMPERIAL FEDERATION**.) Next in dignity to the self-governing colonies are the crown colonies, with legislative bodies partly elective and partly nominated; these are under the Colonial Office, and are ruled by governors and local officials appointed by the home government. Dependences, in the specific use of the term, are subordinate to the government of some other possession, or are provinces or parts of colonies administered by functionaries appointed by the governments on which they are dependent. Protectorates are areas more or less subject to Brit. control by treaty or otherwise, but internally independent. The empire also includes 'spheres of influence' nominally belonging to Britain but either unoccupied or not yet brought under authority. In addition, there are the new territories handed over to Britain as mandatory of the League of Nations, held on specified conditions. The extraordinary growth of the empire between 1837 and the present time may be judged from the fact that in the former year the extent of Brit. territory was under 5,000,000 sq. m., and its population less than 200,000,000, about 30,000,000 being whites. Its area now exceeds 11,000,000 sq. m., more than one-fifth of the land surface of the world, and its pop. 417,000,000—about one-fourth of the world's inhabitants. The absolute dependence of the empire and its trade on Brit. sea-power is too obvious to need more than passing remark. Canada and Australia have now set themselves the task of building up navies of their own. See **GREAT BRITAIN**; **ENGLAND**; **SCOTLAND**; **IRELAND**; **INDIA**; **AFRICA**, etc.

Important dates in development of

British Empire: Cabot lands in Canada, 1497; French colonize Canada, 1535; English E. India Trading Co. formed, 1599; Newfoundland colonized by British 1634; Jamaica captured, 1655; Brit. power supreme in Canada, 1763; Australia annexed by Captain Cook, 1770; Independence of Amer. colonies recognized, 1783; Cape Colony (S. Africa) founded, 1795; Brit. colonization of New Zealand, 1814; Brit. government take over control of India from E. India Co., 1858; Dominion of Canada formed, 1867; First (Canadian) proposal for imperial preference in trade, 1879; Colonial Defense Committee formed, 1885; First Colonial Conference, 1887; Brit. S. Africa Co. formed to colonize Rhodesia, 1889; Brit. power supreme in S. Africa, 1900; Australian Commonwealth proclaimed, 1901; Union of S. African Colonies, 1909; Imperial Defense Conference, 1909; Overseas Dominions first consulted regarding imperial foreign policy, 1911; Self-governing Dominions acknowledged at the Peace Conference to be independent nations 1919.

BRITISH GUIANA, See **GUIANA**, **BRITISH**.

BRITISH HONDURAS, crown colony, E. coast of Central America (18° N., 88° 20' W.), on Caribbean Sea, between Mexican state of Yucatan and Guatemala. The N. is low and full of swamps; S. is mountainous. Staple products are mahogany, logwood, bananas, coffee, cacao, chicle, plantains, etc. Higher ground affords excellent pasturage for cattle. Climate generally damp and hot, but not unhealthy. Colony is administered by a governor, assisted by executive and legislative councils. Cap. and chief port is Belize. Area, 8,600 sq. m.; pop. 43,000, composed mostly of Indians, 1 per cent. Europeans. See **MAP CENTRAL AMERICA**.

BRITISH ISLES, **THE**, name for the area, occupied by the United Kingdom; extensive archipelago on the continental shelf W. of the Continent of Europe (excluding Channel Islands, 49° 50'–61° N., 2° E.–10° 30' W.); separated from Continent by North Sea, Straits of Dover, and the English Channel; consists of two large islands and some 5,000 small islands and islets, occurring either singly or in groups. The largest island is Great Britain (England and Wales; Scotland); the other large island is Ireland. Among single islands are Isle of Man, Anglesea, and Isle of Wight; amongst the groups are Orkney and Shetland Islands and Hebrides (to N. and W. and N.W. of Scotland respectively); Scilly Islands



(S.W. of England); there are numerous groups of small islands round the Irish coast, in the Scot. firths, etc. The Channel Islands belong politically to the U.K., but are physically part of France. Total area, 121,390 sq. m.; pop. 1921, 42,857,144 excepting Ireland for which no census was taken. See MAP BRITISH ISLES.

BRITISH MUSEUM, THE, national depository of books, MSS., and various antiquities and objects of art, Great Russell Street, London. In 1754 Montague House was purchased by the Government for lodgment of Cottonian and Harleian MSS., and the Sloane library and museum; it was opened, 1759, as the B.M., but pulled down, 1845, and the present building erected on its site. The great circular domed reading-room, with wide reading space for 300 readers, was added, 1757. The library contains about 5,000,000 books, and is entitled to a copy of every publication which appears in Gt. Britain. The Natural History exhibits were removed to S. Kensington Natural History Museum, 1880-81.

BRITISH NORTH BORNEO. See under BORNEO.

BRITISH SOMALILAND. See SOMALILAND, BRITISH.

BRITISH SOUTH AFRICA. See SOUTH AFRICA, UNION OF.

BRITISH SOUTH AFRICA COMPANY, chartered company with large administrative powers in Rhodesia, and authorized to carry on trade, work the minerals, etc., in that country; charter granted Oct. 29, 1889, mainly through the efforts of Cecil Rhodes; first administrator, Dr. Jameson (afterwards Sir L. S. Jameson), 1895-6; authorized capital is £9,000,000. See RHODESIA; also under CHARTERED COMPANIES, and annual report of the company.

BRITISH THERMAL UNIT. See B. TH. U.

BRITISH WESTERN PACIFIC, name for all islands in the Western Pacific not within the limits of Fiji, Queensland, New South Wales, or any other civilized power; within the jurisdiction of the High Commissioner for the W. Pacific who is also governor of Fiji. See ELLICE ISLANDS; FANNING; GILBERT ISLANDS; PHOENIX GROUP; SOLOMON ISLANDS; TONGA ISLANDS; and UNION OF TOKELAU ISLANDS.

BRITOMARTIS, Cretan goddess with attributes of Artemis.

BRITON.—(1) Native of Britain; (2) since Union, native of Great Britain or

Brit. Empire.

BRITTANY (c. 48° N., 3° W.), Eng. name for old province of *Bretagne*, France, which forms peninsula, bounded N. by Eng. Channel, W. by Atlantic, S. by Bay of Biscay; coast much indented; surface mountainous. There are many quaint towns, ancient megalithic monuments, and beautiful ruins. People are Celtic; *Breton* language resembles Welsh; ancient *Armorica*, B. was a province under Romans; independent duchy in Middle Ages.

BRIVE, BRIVE-LA-GAILLARDE (45° 9' N., 1° 33' E.), town, Corrèze, France; wine. Pop. 20,600.

BRIXHAM (50° 23' N., 3° 31' W.), seaport and market town, on Torbay, Devonshire, England; principal industry sea-fishing, some coasting and foreign trade; William of Orange landed here, Nov. 1688; cavern, containing prehistoric remains, discovered, 1858. Pop. 8,000.

BRIXTON, S. district, London, England; in metropolitan borough Lambeth. Pop. 75,000.

BROACH, BEARUCH (21° 43' N., 73° 2' E.). (1) ancient city, Bombay, Presidency, India; formerly important seaport and famous for cloth manufacture. Pop. 42,900. (2) district, wooded, cultivated; cotton-mills. Area, 1,467 sq. miles. Pop. 300,000.

BROADCASTING, the sending abroad through the air, from central stations by wireless telephony, of news, music, lectures, weather forecasts and other matters of general interest, for the benefit of those who are provided with receiving outfits or who gather in central places to listen. Broadcasting was taken up on a large scale following the World War, with the restrictions on the use of wireless telephony removed. This was followed by a great increase in the number of radio outfits in use in the United States. By December, 1921, this had reached nearly 250,000, and before the end of 1922 there were well over a million outfits in general use. Broadcasting is done from central stations which are equipped with powerful apparatus and is chiefly in the hands of the larger electrical corporations, including the Westinghouse, the General Electric, etc. This is done, chiefly to stimulate the sale of radio apparatus. Many interesting phases of broadcasting have resulted from the widespread use and simplification of the radio. Important speeches by the President and others are broadcasted, as are concerts, sermons, and matter of any general interest. See RADIO TELEPHONY.

BROAD RIVER, a river in South Carolina, which rises in the Blue Mountains. It joins with the Saluda at Columbia, forming the Congaree River. Its total length is about 200 miles.

BROADS (c. 52° 35' N., 1° 30' E.), low-lying marshy region, Norfolk, England, continuing into Suffolk; contains series of wide shallow lakes; crossed by Yare and other streams.

BROADSTAIRS (51° 21' N., 1° 26' E.), watering-place, Kent, England. Pop. 10,000.

BROADWAY, the chief thoroughfare of New York City, and extending therefrom almost as a continuous highway to Albany. Beginning at Bowling Green, on the southern tip of Manhattan Island, this famous street pierces the heart of the city in a northwesterly direction, and then runs north. It had its beginning in 1643 when a tavern was established at its southern end. Its course through the city is broken by two squares, Union Square at 14th Street, and Madison Square at 23rd Street. Earlier in its variegated career, as the lingering residential character of these squares show, it ran through an exclusive quarter in this section of the city. Today, except in its more northern reaches, it is almost wholly dominated by business establishments. From Bowling Green upward as far as Tenth Street it is a canyon enclosed by buildings extending from ten to fifty stories in height, including the Woolworth (55 stories), the Singer (41 stories) and the Equitable (38 stories). Beyond Grace Church comes the wholesale dry goods establishments, through the shopping district, which only gives way to theatres and other amusement establishments, as well as hotels around 42nd Street. Next come apartment houses, which are much in evidence beyond Central Park. One of the chief subway routes runs under much of Broadway.

BROCA, PAUL (1824-80), Fr. surgeon, pathologist, anthropologist, and medical author; prof. of Surgical Pathology in Paris Faculty of Med. (1867); founded Paris Anthropological Soc. (1859); made discoveries concerning aphasia.

BROCADE, silk fabric, sometimes woven with gold or silver thread, in which the decorative portions appear in low relief against the main substance. During the XIV. cent. heavy b's were chiefly manufactured in Italy; at a later date Lyons was a center of the industry; while at the beginning of the XVIII. cent. Spitalfields began to produce b's.

BROCK, SIR ISAAC (1769-1812),

Brit. commander; distinguished in Canada.

BROCK, SIR THOMAS (1847), Eng. sculptor; besides groups and numerous busts of public persons, amongst his best-known works are the equestrian statue of the *Black Prince* (Leeds) and the *Queen Victoria Memorial* (Buckingham Palace); A.R.A. (1883); R.A. (1891); knighted (1911).

BROCKEN, BROCKSBERG (51° 50' N., 10° 38' E.), highest peak (3,733 ft.), Hartz Mts., Germany; famous for supposed Spectre, really beholder's shadow projected through and magnified by mists.

BROCKHAUS, FRIEDRICH (1772-1823), Ger. publisher; completed the issue of the *Konversations-Lexikon* (1810-11), besides numerous other valuable bibliographical and hist. works.

BROCKTON, a city in Massachusetts, in Plymouth co. It is on the New York, New Haven and Hartford Railroad and is 20 miles south of Boston. Brockton is famous for its manufacture of boots and shoes, and in this industry it is one of the most important cities in the country. It has also manufactures of rubber goods, shoe machinery and tools. It includes 6 villages. The city was settled in 1700 and was incorporated as a town in 1821. It received a city charter in 1881. There are banks, an excellent public library and public schools. Pop. 1920, 66,138.

BROCKVILLE, a city of Ontario, Canada, the county seat of Leeds co. It is on the St. Lawrence River and on the Grand Trunk, Canadian Pacific, and other railroads, 125 miles southwest of Montreal. It is a port of entry and a port of call for steamers on the St. Lawrence River. Its industries include the manufacture of agricultural implements, cigars, gloves, leather, etc. It received its name from General Sir Isaac Brock, an English officer killed in the battle of Queenstown. Pop. about 12,000.

BRODHEAD, JOHN ROMEYN (1814-73), Amer. historian; started investigation of sources of Amer. colonial history.

BRODIE, WILLIAM (d. 1788), Scot. criminal; was a master cabinetmaker in the Edinburgh Lawnmarket (known as 'Deacon Brodie'); committed numerous daring burglaries, for which he was tried and hanged; subject of a play by Stevenson and Henley.

BRODY (50° 7' N., 25° 10' E.), town, Poland, commercial center; leather. Pop. 20,000.

BROGLIE

BROGLIE, Fr. noble family who emigrated from Piedmont, 1643, when they assumed title of *Comtes de Broglie*. Distinguished members are: (1) Victor Maurice (1647-1727), marshal of France, 1742; (2) François Marie (1671-1745), marshal of France, 1734, duc de Broglie 1724; (3) Victor François (1718-1804), marshal of France, 1759, became an *émigré* at the Revolution; (4) Charles François (1719-81), distinguished diplomatist; (5) Victor Claude (1757-94), *marechal de camp*, Revolutionist and Jacobin, but executed in the Terror; (6) Achille Charles Léonce Victor (1785-1870), statesman, attempted to keep France both from reaction and violent democracy; strengthened country by friendship with Britain.

BROKEN HILL (30° 58' S.; 141° 21' E.), town, N.S.W., Australia; silver mines. Pop. 35,000.

BROKER, an agent employed to make bargains in matters of trade or navigation for other people in return for a compensation called *brokerage*. He is, in short, a mercantile agent. A b. is not in possession of the goods which are the subject of the contract. He cannot as a rule buy or sell in his own name when acting for other people, and he is not liable to be sued on the contract which he enters into on behalf of others, unless he appears in the contract to be a principal. When a b. makes a contract for others, he enters the terms of the contract in his own book, and then sends a copy of the entry to both parties. These copies should be identical, otherwise there may be no contract at all, especially, as often happens, when the b. has not entered the terms in his book.

Insurance b's are employed to effect policies of insurance. The underwriter is paid the premium by the b., who in turn looks to the insured for the premium. He receives the policy of insurance from the underwriter, and it is his duty to see that the policy is drawn up. He must use all diligence in obtaining adjustment and recovering the loss for the insured. If the b. pays the full loss to the insured, not knowing one of the underwriters to be bankrupt, he is prevented by trade custom from recovering it. Ship b's are employed to effect the charter of a ship. They are usually paid a commission of 5% on the freight by the shipowner. Stock b's are persons who negotiate for the purchase or sale of securities on the Stock Exchange. When any person wishes to buy or sell shares or stock he employs a b., who in turn sells the shares to or buys the shares from, a stock-jobber.

BRONTE

BROMBERG (53° 7' N., 18° E.), town, Prussia: iron foundries. Pop. 60,000.

BROMINE (Br.; At. Wt. 80); non-metallic element, chemically similar to chlorine, heavy, dark-red liquid giving off red, evil-smelling (Gk. *bromos*, a stench), poisonous vapor; B.P. 59-60°; solidifies at -24°; sp. g. 3.19; soluble in water, solution having bleaching powers. B. occurs combined with potassium and sodium in sea and some mineral waters and salt beds. B. and its compounds are used in photography, medicine (those of potassium and sodium as valuable sedatives), and manufacture of coal-tar colors.

BROMLEY (51° 24' N.; 0° 1' E.); market town, Kent, England. Pop. 30,000.

BRONCHIECTASIS, a cylindrical or saccular dilatation of the bronchial tubes, most often occurring with chronic bronchitis or chronic pneumonia.

BRONCHITIS, inflammation of the mucous membrane of the bronchial tubes, is usually due to a chill. It is a frequent accompaniment of many specific fevers, especially measles and typhoid, and of many other lung diseases, or it may result from the spreading of a laryngitis. Certain occupations which expose individuals to a constant dusty or otherwise irritating atmosphere (e.g., masons, cotton-millers, chemical manufacturers, predispose towards b. The symptoms are pain behind the sternum, frequent cough, shortness of breath, slight rise of temperature; and an attack usually lasts one to three weeks. The treatment is, in the first stage to promote the secretion; when it is free, stimulate the mucous membrane in order to get rid of it, and then improve the general condition with tonics, cod-liver oil, etc.

BRONCHOCELE. See GOITRE.

BRONCO. See under HORSE FAMILY.

BRONGNIART, ADOLPHE THÉODORE (1801-76), Fr. botanist; b. Paris; M.D. (1826); director of Museum of Nat. History (1833); wrote important work on Fossil Plants (1828-37); founded and was 1st pres. of Fr. Bot. Soc. (1854).

BRONN, HEINRICH GEORG (1800-62), Ger. scientist; adopted Darwinian theory; wrote on zool. and geol.

BRONSART VON SCHELLENDORF PAUL (1832-91), Pruss. general and military author.

BRONTË (37° 45' N.; 14° 49' E.); town, Sicily; Nelson cr. Duke of B. 1799. Pop. 19,000.

BRONTÉ, CHARLOTTE (1816-55), **EMILY** (1818-48), and **ANNE** (1820-49), Eng. novelists; were three dau's of Rev. Patrick Brontë, incumbent of Haworth, a wild moorland parish in the West Riding of Yorkshire. The children were left motherless at an early age, and the f., a man of hard nature and eccentric habits, lavished what affection he had for his offspring upon his only s., Branwell, who turned out a sot and a wastrel, and came to an early grave. It became Charlotte's business to 'mother' the family, and in their lonely life the three girls found solace in literary composition. Their first venture was a volume of *Poems*, under the pseudonyms, *Currer, Ellis, and Acton Bell*, 1846; which cost them £50, and only one or two copies were sold.

Notwithstanding this failure the sisters next applied themselves to novel-writing. Charlotte wrote *The Professor*, which, however, proved too short for the publishers to whom it was offered, and it did not appear in print until after her death. In the meantime she wrote *Jane Eyre*, which was pub. in 1847, and at once achieved a popular success. It was followed by *Shirley*, 1849; and *Villette*, 1852. In 1854 she married her f.'s curate, Rev. A. Nicholls, but died in the following year. Emily was the author of *Wuthering Heights*, 1848; and Anne pub. *The Tenant of Wildfell Hall* and *Agnes Grey*, 1848. The novels of the Brontë sisters have held a secure place in Eng. fiction for the past sixty years and more, and there is little evidence that their popularity is likely to diminish.

BRONTOSAURUS. A huge herbivorous dinosaur, belonging to the sub-order Sauropodia. Fossil remains of this prehistoric animal have been found in the Jurassic strata of the state of Wyoming. The animal was of enormous size and of clumsy structure. Its total length reached sixty feet, and it is estimated that the full grown animal weighed at least twenty tons. Its body was short and thick, and it possessed a long, slender neck, with a very small head, somewhat resembling a lizard's in shape. Its tail was large, thick and heavy, and that it walked on all fours is indicated by the fact that its forelegs and hindlegs were of the same length. It was flat-footed, and an idea of its almost incredible size may be gathered from the fact that its footprint covered an area of a square yard. An examination of the skeleton points to the conclusion that it was a clumsy, slow-moving creature, while the small head clearly indicates that it was of low intelligence. It is assumed that its food

consisted largely of aquatic plants, on the upper portions of which its long neck enabled it to feed with ease. Its bones differ from those of other dinosaurs in that they are solid like those of the diplodocus, whereas the bones of the dinosaurs are usually hollow. Other characteristics of the Sauropoda, to which order the Brontosaurus belongs are spatulate teeth, a small skull, a long tail and five toes on each foot.

BRONTOTHERIUM, or TITANOTHERIUM. A type of huge prehistoric animal, whose fossil remains have been found in Oligocene formations in various parts of North America. They somewhat resembled the modern rhinoceros, and belonged to the order of Perissodactyls. They were characterized by curious horny growths proceeding from the maxillary bones and curving upward so that they overhung the snout. A number of specimens have been unearthed from different strata, and it has been possible to follow the evolution of these horns through many generations. In the earliest specimens they are mere knobs growing on each side of the snout, but in succeeding generations they developed rapidly until, in the Titanotherium ramosum and the Titanotherium platyceras, the last survivors of their race, they are wide-spreading flat horns of considerable size. The best known of these fossils is the Titanotherium robustum, which is 14 feet long and 5 feet high.

BRONX, THE, a borough and county, part of New York City, extending beyond the Harlem river on the north. It is largely a residential section, but is specially noted for its park acreage, which makes it a favorite resort at holiday times in the summer. Its open spaces include Bronx Park, of 719 acres, 264 acres of which is covered by the New York Zoological Park, the largest 'zoo' in the world in point of space and number of specimens, while another 330 acres in the same park is occupied by the New York Botanical Garden, which contains extensive plantations, greenhouses and a museum. Other open spaces are Pelham Bay Park, of 1,756 acres, and eight miles of water front and Van Cortlandt Park, of 1,132 acres, noted for its golf links. The Bronx has a number of attractive parkways, which include the Grand Boulevard, Moshulu, the Bronx and Pelham, Spuyten Duyvil, Crotona, and the Bronx river parkways, the last named running along both banks of the river for 15½ miles. The borough takes its name from the river, which runs through it. It covers an area of about 40 square miles and in 1920 had a population of 732,016.

BRONZE

BRONZE, alloy of copper (80%) and tin (20%); with frequently addition of zinc, sometimes also of phosphorus, or manganese; used for coins, bells (on account of its resonance), and statues. Exposure to atmosphere produces green coating of copper carbonate. Aluminium b. or gold b. contains 5% of aluminium and is used for cheap jewelry.

BRONZITE, silicate of magnesia and ferrous oxide, a rock-forming mineral belonging to pyroxene group.

BROOCH (Fr. *brocher*, to pierce), ornamental device for fastening two articles or ends together, the pin and hook being usually concealed behind an ornamental plate, but sometimes an integral part of the ornament, as in the Irish b. The Tara b. is formed from hollow circle cut across by great pin which attaches by piercing without a hook, and stones are set into border of circle among interlaced filigree work.

BROOK FARM (c. 42° 18' N., 71° 10' W.), district, near West Roxbury, Massachusetts, where an attempt was made at founding a socialistic settlement in 1841 by George Ripley and others. Members had to do certain amount of work daily; dissolved, 1847.

BROOKE, RUPERT (1887-1915), Eng. poet; traveled on Continent, U.S., Canada, and South Seas (1913). At outbreak of Great War joined Royal Naval Division; in Antwerp Expedition (Oct. 1914); with Mediterranean Expeditionary Force (Feb. 1915), d. on Fr. hospital ship at Lemnos. His *Letters* and his *Poems* pub. 1918 in collected edition with memoir. Remarkable poetic gift; output small, but of high rank; a master of the sonnet form.

BROOKE, SIR JAMES (1803-68), Rajah of Sarawak (1841); Brit. colonial gov.; aided Sultan's forces to reduce revolted tribes of Sarawak (1839-41); ruled as Rajah (1841-46); island of Labuan purchased for Brit. colony, and Brooke made gov. (1847); charged with maladministration and displaced (1851); driven from Sarawak by pirates (1867). Under an agreement in 1888 Sarawak was recognized as independent State under the Protection of Great Britain. It is now ruled by a Rajah, H. H. Charles Vyner Brooke, a descendant of Sir James Brooke.

BROOKE, STOPFORD AUGUSTUS (1832-1916), Brit. Unitarian minister and author; sometime chaplain-in-ordinary to Queen Victoria; later of Bedford Unitarian Chapel; author of *Poems*, 1888; *Primer of Eng. Literature*, 1876; *History of Early Eng. Literature*, 1892;

BROOKLYN

and numerous other literary and critical works.

BROOKFIELD, a city of Missouri, in Lynn co. It is on several railroads and on Yellow Creek. In the neighborhood are important coal mines. Its industries include iron works, railroad machine shops and shoe factories. Pop. 1920, 6,304.

BROOKHART, SMITH WILDMAN (1869), U.S. Senator and lawyer, b. Scotland County, Missouri. Much of his career he devoted to military pursuits. From 1894 to the World War, except for an interval of five years, he belonged to the Iowa National Guard. In the Spanish-American War of 1898 he was a second lieutenant in the 50th Iowa Volunteer Infantry. He also saw service on the Mexican border as major in the 1st Iowa Brigade. In the World War he was a major and lieutenant-colonel of infantry. As a sharpshooter he became chief instructor in marksmanship in the Camp Perry and Camp Benning Schools. In his political activities he acted as chairman of the Iowa Republican State Convention in 1912, and in 1922 was elected to the U.S. Senate to fill the unexpired term, ending in 1925, of Senator William S. Kenyon.

BROOKHAVEN, a township in Suffolk co., Long Island. It includes a number of villages, the largest of which is Patchogue. Pop. about 17,000.

BROOKITE, mineral, titanium dioxide (TiO₂), occurring in right prismatic transparent to opaque yellowish-red crystals in igneous rocks (Snowdon, Tremadoc).

BROOKLINE, a town of Massachusetts, in Norfolk co. It is on the Boston and Albany railroad, and on the Charles River, 3 miles west of Boston. It is almost entirely a residential city and is one of the most beautiful and wealthy suburban towns in the country. It has long had the distinction of being the wealthiest town per capita in the United States. It retains the town form of government through a special form of 'limited town meetings.' Within the town are many places of historic interest. Pop. 1920, 37,748; 1923, 41,336.

BROOKLYN, bor. of New York City (40° 40' N., 74° W.), western end of Long Island and connected with mainland by bridges; favorite residential quarter; beautiful parks, of which Prospect Park is much the largest; many educational institutions, of which the most remarkable is the Institute of Arts and Sciences; over 130 grammar schools, some good private schools and colleges, and many excellent libraries. Public

buildings include white marble city hall, state arsenal, museum; U.S. navy yard is here, and a marine hospital; important trading and manufacturing center; flour mills, sugar refineries, brass works, and breweries. Brooklyn was founded by Walloon colonists in 1636; site of battle during War of Independence; was incorporated with New York in 1898. Pop. 1920, 2,022,356.

BROOKLYN INSTITUTE OF ART AND SCIENCES, an educational institution situated at Prospect Park, Brooklyn, N. Y. It developed as an outgrowth of the Brooklyn Apprentices' Library Association and dates from 1843. It is one of the most notable educational establishments in New York City, and a center of social, literary, artistic and scientific activities. Reincorporated in 1890, it had since then expanded on lines that promise its future preeminence as a national academy. The departments of teaching embrace archaeology, architecture, astronomy, botany, chemistry, domestic science, electricity, engineering, entomology, geography, geology, law, mathematics, microscopy, mineralogy, music, painting, pedagogy, philology, philosophy, photography, physics, political science and photography. Its courses are regarded among the best tuition obtainable in arts and sciences, and only small fees are charged. The institution controls the Brooklyn Museum, which contains many treasures of prehistoric America, with the Botanic Gardens adjoining it, as well as a Children's Museum, the first of its kind, and a biological laboratory. It has frequently been the recipient of valuable bequests. In 1921 the institute's four departments, education, museums, botanic gardens and biological laboratory, had an enrollment of 10,850 students. It has a library containing some 25,000 volumes. The institutes permanent funds in 1921 exceeded \$1,000,000.

BROOKLYN BRIDGE. See **BRIDGES**.

BROOKS, CHARLES WILLIAM SHIRLEY (1816-74), Eng. novelist; ed. for law, but adopted journalism, and was on the staff of *Morning Chronicle*, *Illustrated London News*, and *Punch*, becoming editor of the latter. His novels include *Aspen Court*, *The Gordian Knot*, *The Silver Cord*, and others.

BROOKS, NOAH (1830-1903); American author and journalist; b. Castine, Me. He entered newspaper work in 1850 and at various times was connected with newspapers in New York, Washington, Massachusetts and Cali-

fornia. He wrote books of travel and biography, but his reputation is chiefly based on his stories for boys which achieved a wide popularity. His publications include *The Fairport Nine*, 1880; *Our Baseball Nine*, 1884; *American Statesmen*, 1893; *Short Stories in American Party Politics*, 1896.

BROOKS, PHILLIPS (1835-1893), an American Protestant Episcopal bishop, b. in Boston, in 1835. He graduated from Harvard and after completing his studies in divinity became rector of Protestant Episcopal churches successively in Philadelphia and Boston, obtaining a wide reputation through his eloquence as a pulpit orator, and was also known for his fairness and liberal-minded attitude in matters of doctrine. He became Bishop of Massachusetts in 1891. At the time of his death, in 1893, he was probably the most widely known clergyman in the United States. His writings also were very popular. They include letters of travel, lectures on preaching, and essays and addresses. He died in Boston, January 23, 1893.

BROOKS, WILLIAM ROBERT (1844-1921), an American astronomer who made notable stellar discoveries. He was of English birth and came with his parents to this country in 1857, when he was thirteen years old, completing his education in the United States. He constructed a telescope at fourteen and was lecturing on astronomy at eighteen. He became a mechanical draughtsman of great skill and made a number of photographic inventions to enable him to pursue his astronomical studies. In 1874 he established the Red House Observatory at Phelps, N. Y., where he attracted attention by his discovery of eleven comets through the telescope of his own making. In 1888 he took charge of the Smith Observatory at Geneva, N. Y., and his studies there produced further discoveries of comets. By 1906 he added thirteen to his earlier discoveries. He became professor of astronomy at Hobart College, a fellow of the Royal Astronomical Society of Great Britain and a member of other learned bodies, American and foreign. During the active period of his career he acquired considerable popularity throughout the country as a lecturer on astronomy.

BROOM, evergreen shrub, *Sarothamnus Scoparius*; common on sandy soil; large, yellow, papilionaceous flowers; twigs used for brooms and thatching roofs, juice of tops medicinally as diuretic and laxative; many foreign species form handsome garden and greenhouse plants.

BROTHERHOODS, RAILROAD. The four leading labor unions of railroad employes in the United States are known by this name. They are the Grand International Brotherhood of Locomotive Engineers; the Order of Railroad Conductors; the Brotherhood of Locomotive Firemen and Enginemen; and the Brotherhood of Railroad Trainmen. Sometimes the Brotherhood of Railroad Telegraphers is included among them. The Locomotive Engineers are the oldest group, their organization dating from 1863. Today it is one of the largest and most powerful of the brotherhoods, with a membership (1922) of 85,255, and headed by a notable labor leader, Warren S. Stone. The Railroad Conductors next organized in 1868, but the progress of the early union was impeded by dissensions on strikes, resulting in a non-strike policy that lasted from 1877 to 1890. Abstention from strikes was abandoned, thereafter in the formation of a new brotherhood by seceding members of the original order. Unity came with the inclusion in the new body of those who had stood by the old organization, which was disbanded. The membership in 1921 was 54,344. The Brotherhood of Locomotive Firemen and Enginemen was first organized in 1873, and a few years later absorbed a rival body, the International Firemen's Union. About this time its history was marked by the prominence of Eugene V. Debs in its conduct and the progress it made under his organizing ability. The Brotherhood of Railroad Trainmen, established in 1883, includes conductors, baggagemen, brakemen, flagmen and train and yard switchmen.

The Railroad Brotherhoods are not affiliated with the American Federation of Labor. They operate independently of organized labor unions in general and have features which distinguish them from the other bodies. Generally they observe a conservative attitude in labor disputes, but occasionally spend large sums for strike purposes. Most of their funds, however, are devoted to the payment of death and disability insurance. They have grievance committees for adjusting differences between their members and employers and for avoiding strikes, and succeed in maintaining agreeable relations with the companies. Wage schedules, hours of labor, gradations and promotions and other questions with which labor organizations commonly deal are embraced in their jurisdiction. The brotherhoods enter into agreements with the railroads, fixing hours and conditions of labor, and have been instrumental in obtaining increased wages and general improvement in working conditions. The

brotherhoods have the power to federate for the purpose of adjusting any complaint which may be presented in accordance with the laws of the organization aggrieved. In 1916 the brotherhoods did so by uniting in calling a strike for an eight-hour day instead of the ten-hour day named in the contracts with the railroads. The passage of the Adamson Eight-Hour Law averted the strike, but the acts constitutionally remained in question, and the strike threat was revived until the Supreme Court delivered its decision upholding the measure as constitutional. There are a number of lesser railroad labor unions, among them brotherhoods of maintenance-of-way men, switchmen, carmen, clerks, mechanical trackmen, freight handlers, signalmen, station agents and employees, expressmen and messengers.

BROTHERHOODS, RELIGIOUS. orders whose members have devoted themselves to a life of religious effort. Religious orders existed among the pagans and the Jews before the time of Christ, and it is believed that Christ was Himself a member of one of these orders during His earlier life. In Christian Europe, however, regularly incorporated orders of this kind did not appear before the tenth century, when St. Anthony and later St. Benedict drew up rules for their self-government. There were also two classes of these orders, the regular clergy, and the monks. The latter were at first regarded as mere laymen, but during the eighth century they were gradually accorded the same status as the clergy. Most of the brotherhoods are found among the Catholics, but there are many orders attached to the Eastern Church, which adhere to the rules of St. Basil. Brotherhoods are also connected with the Church of England, or Protestant Episcopal Church in this country, but in these the rules are less strict, either being adapted or newly formulated. A common feature of all the rules is a year's probation on the part of the novice, after which he binds himself to a life of poverty, chastity and obedience to the superior brother. There are in the United States at the present time about 80 brotherhoods established.

BROTHERS OF COMMON LIFE, religious community established by Gerhard Groot in Deventer, c. 1380; to it St. Thomas à Kempis belonged; members devoted themselves to good works, but lived their ordinary life in the world; extinct about 1750.

BROUGHAM AND VAUX, HENRY PETER BROUGHAM, 1ST BARON (1778-1868), English lord chancellor;

b. Edinburgh; educated at Edinburgh High School and Univ.; admitted to Scot. bar, 1800; co-operated in founding *Edinburgh Review*, 1802, and contributed eighty articles to first twenty numbers; entered at Lincoln's Inn, 1803; settled in London, 1805; and was called to Eng. bar, 1808. Entering Parliament, 1810, he was soon regarded as a possible leader, and carried a bill making slave trading felony. He was without a parl. seat, 1812-16. Returned for Winchelsea, 1816, he became a prominent Opposition member, defeated Income Tax Bill, and zealously advocated extension of popular education.

As Queen Caroline's attorney-general, 1820, his management of her case won his fame. He introduced a great scheme of law reform, 1828, was returned for York, 1830, and in Nov., although Whig leaders would have gladly omitted him from the cabinet, he was made lord chancellor. Whig Government broke up in 1834, and on its reconstruction, 1835, Brougham was excluded. He died at Cannes. Versatile, egotistical, turbulent, he is chiefly remembered as a law reformer and as an author.

BROUGHAM, JOHN (1814-80), Irish dramatist and actor; a prolific writer of plays, one of his best-known being *The Duke's Motto*; as an actor he was very successful in Irish parts.

BROUGHTON, RHODA (1840-1920), English novelist; wrote numerous works of fiction, including *Cometh up as a Flower*, *Second Thoughts*, *Dear Faustina*, *Between Two Stools*, *The Devil and the Deep Sea*.

BROWN, HEYWOOD (CAMPBELL) (1888), newspaper man and dramatic critic; *b.* Brooklyn, N. Y. He studied at Harvard University (1906-10). Beginning his journalistic work as a reporter on the N. Y. Morning Telegraph (1908-12) he went to the N. Y. Tribune in 1912. He was sent to France by that paper as correspondent with the A.E.F. in July, 1917. Of recent years his work has chiefly consisted of dramatic criticism. He has contributed many articles to magazines and has written *With General Pershing and the American Forces*, 1918.

BROUSSARD, EDWIN SIDNEY (1874), American legislator, *b.* Iberia Parish, La. He graduated from Louisiana State University 1896 and later studied law at Tulane University. In the Spanish American war he saw service as captain of the 2nd U.S. Volunteer Infantry. He was assistant secretary to the Taft Commission to the Philippines, 1900. He was appointed district attorney of his State in 1903 and was

re-elected twice to the same office, once as a Democrat and again as a Progressive. He was the candidate for lieutenant governor of Louisiana on the Progressive ticket in 1916. In 1920 he was chosen as United States Senator from his State for the term 1921-27.

BROUSSARD, ROBERT F. (1864-1918), American legislator; *b.* New Iberia, La. He studied at Georgetown University, Washington, D. C., and graduated from the law school of Tulane University, La., in 1889. He engaged in the practice of law and entered actively into politics. He was twice elected prosecuting attorney of his district, resigning the office to enter Congress. He was a member of the U.S. House of Representatives for 18 years—from the Fifty-fifth to the Sixty-third Congress—both inclusive. He was elected to the U.S. Senate in May, 1912, for the term beginning March 4, 1915. He died during his term of office.

BROUWER, ADRIAN (1606-38), master of Dutch school of *genre* painting.

BROWN SPAR, 'pearl-stone,' name of certain crystalline varieties of dolomite (*q.v.*), or magnesium limestone tinged with peroxide of iron; lustre, pearly.

BROWN, BENJAMIN GRATZ (1826-1885), American lawyer and legislator; *b.* Lexington, Ky. He graduated from Yale, 1847, and entered upon the practice of law in Missouri. From 1852 to 1858 he was a member of the Missouri Legislature. At the outbreak of the Civil War he espoused the Union side, entered the army and attained the rank of brigadier general of volunteers. He was United States Senator from Missouri (1863-67) and in 1871 was chosen governor of that State. He was the nominee for the vice presidency [on the Greeley ticket] in 1872.

BROWN, CHARLES BROCKDEN (1771-1810), Amer. novelist; author of *Wieland*, *Arthur Mervyn*, *Ormond*, etc. The weird element enters largely into B.'s writings, which show the influence of Godwin and similar authors.

BROWN, FORD MADOX (1821-93), Eng. artist; *s.* of a navy purser; displayed a remarkable talent for realistic treatment of hist. episodes, some of his best-known pictures being *Christ Washing Peter's Feet*, *Romeo and Juliet*, *Don Juan*, *Shakespeare*, *Chaucer at the Court of Edward III.*, etc.

His *s.*, Oliver Madox B. (1855-74), showed astonishing precocious genius, exhibited pictures, and pub. a novel,

Gabriel Denver. His g.-children are the distinguished writers Ford Madox Hueffer, who wrote an account of the circle in *Ancient Lights*, and Oliver Madox Hueffer ('Jane Wardle').

BROWN, GEORGE LORING (1814-89), Amer. landscape painter of classical school; imitated Fr. school of XVII. cent.

BROWN, GOOLD (1791-1857), Amer. grammarian; b. Providence, R. I. For more than a score of years he was a teacher in New York City. He was a profound student of the English language and published many works on English grammar that had an extraordinary reputation. His *Grammar of the English Language*, 1851, is a classic in pedagogical literature. He wrote *Institutes of English Grammar*, 1823, a revised edition of which was published in 1907.

BROWN, HENRY KIRKE (1814-86), Amer. sculptor, executed statues of George Washington and Pres. Lincoln for New York, and numerous others of public men for Washington (D.C.), and elsewhere.

BROWN, JACOB (1775-1828), Amer. general in wars against Britain.

BROWN, JOHN (1810-82), Scot. physician and essayist; author of *Horae Subacinoe*, 1858-61; *Rab and His Friends*, 1859; *Marjorie Fleming*, 1863; *John Leech and Other Papers*, 1882.

BROWN, JOHN (1800-59), Amer. abolitionist; in 1855 played important part in 'Pottawatomie Massacre' during border strife in Kansas and Missouri; organized plot to free slaves of Virginia, and in October 1859 seized Harper's Ferry; wounded, tried by courtmartial, and hanged. He is the subject of popular song during Civil War:—'John Brown's body lies a-moulding in the grave, But his soul goes marching on.'

BROWN, PRESTON (1872), American army officer; b. Lexington, Ky. He graduated at Yale, 1892, and entered the army as a private in 1894. In 1914 he graduated at the Army Staff College. He rose through the various grades until he was made colonel in Feb. 1918. He served with distinction in the World War as Chief of Staff, Second Division at Chateau-Thierry, Soissons and St. Mihiel, Apr.-Sep. 1918, and as Commanding General of the Third Division in the Argonne-Meuse campaign. He received the D.S.M. for 'exceptionally meritorious and distinguished service.'

BROWN, THOMAS (1778 - 1820), Scot. philosopher; succ. Dugald Stewart

as prof. of Moral Philosophy at Edinburgh, where he achieved great popularity as a lecturer. His *Lectures on the Philosophy of the Human Mind* had an extensive sale. He also wrote a considerable amount of poetry.

BROWN, THOMAS EDWARD (1830-97), Manx poet and schoolmaster; assistant-master at Clifton Coll. (1863-92); author of *Fo'c'sle Yarns*, 1881; *The Doctor and Other Poems*, 1887; *The Manx Witch*, 1889; *Old John and Other Poems*, 1893; *Collected Poems*, 1900. Many of his narrative poems are written in the Manx dialect.

BROWNE, CHARLES FARRAR (1834-1867), an American humorist, better known as Artemus Ward, a name which he adopted both in his writings and his lectures. He was born in Waterford, Me., and learned the printing trade. He was afterwards editor of several papers in Ohio, in which were published some of his earlier humorous matter. This was written with curious and original misspelling of words. These writings soon made him famous and he engaged in lecturing in the United States and afterwards in England. In the latter country he lived for several years and became a contributor to Punch. Browne was one of the founders of the American school of humorous writing, and his reputation in foreign countries was quite as favorable as at home. He died in Southampton, England, March 6, 1867.

BROWNE, HABLOT KNIGHT (1815-82), Eng. artist; better known as Phiz; b. London, of Huguenot descent; apprenticed to the engraver Finden; had ambition to make a reputation as an artist, but, meeting with Dickens in 1836, he was pressed into service as an illustrator of the *Pickwick Papers*, then appearing serially. He was also the illustrator of *David Copperfield*, *Dombey and Son*, *Martin Chuzzlewit*, and *Bleak House*, besides many of the novels of Ainsworth, Lever, and Smolley.

BROWNE, ISAAC HAWKINS (1705-60), Eng. poet and wit; author of *The Pipe of Tobacco*, a poem which satirized the chief poets of his time; and a Latin poem, *De Animi Immortalitate*, which was admired for its display of scholarship.

BROWNE, MAXIMILIAN ULYSSES, COUNT VON (1705-57), Austrian general; field marshal, 1753; idolized by soldiery; name given (1888) to Aust. infantry regiment.

BROWNE, PORTER EMERSON (1879), American novelist and playwright; b. Beverly, Mass. He studied at

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the Newton, Mass., High School and in 1901 began writing short stories, essays and verse. Later he devoted himself to writing plays and novels. His most notable play, *A Fool There Was*, was produced in 1906. His novels include *The Spendthrift*, 1908; *A Girl of Today*, 1915; *Peace at Any Price*, 1916; *Scars and Stripes*, 1917; *Someone and Somebody*, 1917.

BROWNE, ROBERT (1550-1630), founder of extreme Puritan, anti-episcopalian sect especially obnoxious to Queen Elizabeth; the Brownists were partly suppressed by Whitgift's Court of High Commission, but secretly formed first Dissenting body, that of the Independents.

BROWNE, SIR THOMAS (1605-82), Eng. author and physician; b. London; ed. Winchester and Oxford; traveled abroad, and then practised med. at Norwich (1637); author of *Religio Medici*, 1643; *Pseudodoxia Epidemica*, 1646; *Hydriotaphia or Urn-Burial*, 1658. Amid the stirring affairs going on around him in England, he had a singularly detached and contemplative mind, which he exhibits in his works. They are written in an elaborate and rich style, which is one of the most admired in Eng. prose. *Life*, by Gosse, 1905; *Sir Thomas B.; an Appreciation*, by Whyte, 1898.

BROWNE, WILLIAM (1591-1643), Eng. poet; author of *Britannia's Pastorals* (1613-16), and *The Shepherd's Pipe*. His poems celebrate the charms of his native Devonshire, and were read by, and to some extent influenced, Milton, Herrick, and Keats.

BROWNELL, WILLIAM CRARY (1851), American critic and essayist; b. New York City. He graduated at Amherst and engaged in literary work in the metropolis. He was on the editorial staff of Scribner's Magazine, and in 1888 became and has since remained literary adviser of Charles Scribner's Sons. His perceptions were keen, his sympathies broad and his knowledge profound. He has been closely en rapport with French art and literature and his critical studies in English prose have been masterpieces of their kind. He is a member of the American Academy of Arts and Letters. His works include *French Art*, 1892; *Newport*, 1896; *Victorian Prose Masters*, 1901; *Criticism*, 1914; and *Standard*, 1917.

BROWNING, ELIZABETH BARRETT (1806-61), Eng. poetess; dau. of Edward Moulton-Barrett. At the age of ten she began to write verse, and her first vol. of poetry, *An Essay on Mind*

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and Other Poems, was pub. when she had reached the age of nineteen. It was followed by *Prometheus Bound*, 1833; *The Seraphim and Other Poems*, 1838; and two vols. of *Collected Poems*, 1844; including *The Drama of Exile*, *The Vision of Poets*, and *Lady Geraldine's Courtship*. In the following year she first met her future husband, Robert Browning, whose poetry she had already admired. They were married privately in 1846, she being then thirty-seven and Browning thirty-four, after which they went to Pisa, and later settled at Florence. *Sonnets from the Portuguese* appeared in 1850, *Casa Guidi Windows*, 1851; and her great poem, *Aurora Leigh*, 1856. In 1860 she published a collected edition of her poetical work, under the title of *Poems before Congress*.

BROWNING, JOHN M. (1855), an American inventor, b. at Ogden, Utah. His f. was a gunsmith and at the age of 13 the s. had made a gun of scrap iron. In 1879 he invented and patented a breech-loading rifle; in 1884 a repeating rifle, and in 1885 a box magazine. The years following were devoted to the invention and perfection of automatic guns. These were adopted by European governments, and an automatic pistol was adopted by the United States government in 1908. The Browning machine gun and machine rifle (q.v.), were made the official weapons of the United States Army, and many of them were manufactured. They were generally considered to be the most effective and simplest machine gun used in the World War. See BROWNING MACHINE GUN.

BROWNING, OSCAR (1837), English author; b. London. He was educated at Eton and Cambridge, graduating from the latter in 1860. He taught at Eton and was lecturer in history and political science at Cambridge, later becoming principal of the University Training College for Teachers. Among his numerous writings may be cited *Modern France*, 1880; *History of England*, 1890; *Wars of the Nineteenth Century*, 1899; *Letters from India*, 1902; *The Fall of Napoleon*, 1907; *History of the Modern World*, 1912; and *General History of Italy*, 1915.

BROWNING, ROBERT (1812-89), Eng. poet; b. London; s. of Robert B., an official in the Bank of England; ed. privately, and at University Coll.; pub. his first poem, *Pauline*, anonymously in 1833. Two years later he issued *Paracelsus*, a long dramatic poem, which met with little success, but found appreciative readers in Wordsworth, Carlyle, and other men of letters. In 1837 Macready produced

BROWNING MACHINE GUN

his *Strafford*, and in 1840 *Sordello* was published. These were followed by *Bells and Pomegranates*, 1841; *A Blot on the 'Scutcheon*, 1843; *Luria*, and *A Soul's Tragedy*, 1846. In the latter year he married Elizabeth Barrett, and went to live in Italy, returning to England after his wife's death in 1861. *Men and Women* appeared, 1855; *Dramatis Personae*, 1864; *The Ring and the Book*, 1863-69; *Balaustion's Adventure*, 1871; *Fifine at the Fair*, 1872; *Red Cotton Night-Cap Country*, 1873; *The Inn Album*, 1875; *Pacchiarotto*, 1876; *La Saïas*, 1878; *Dramatic Idylls*, 1879-80; and *Asolando*, 1889, was pub. on his death-day.

BROWNING MACHINE GUN. A machine gun known under the name of Colt but manufactured under the patents of Browning. The automatic continuous firing feature of this machine gun is attained by utilizing the energy of the gases generated by the burning powder, after the projectile has reached its maximum velocity, and before it leaves the gun barrel, to eject the discharged cartridge shell, place a fresh cartridge in the breech, close the breech block and fire the piece.

The spent gases are led through a small radial slot or vent in the barrel, so placed as to be slightly beyond the point where the projectile reaches its maximum velocity. Thus any gases which are still expanding in the barrel do no further work on the projectile after it has passed the slot. Therefore, their energy can be utilized without reducing the efficiency of the gun. After passing through the slot the gases are conducted to a small cylinder in which they act on a piston, forcing it forward against the action of a spring, which returns it to its original position after the projectile leaves the gun barrel and the pressure in the barrel and cylinder has been released. The piston actuates a lever, which through proper mechanism, ejects the discharged cartridge, inserts a fresh one and fires it.

The cartridges are fastened to belts and are fed to the gun automatically. The belts usually hold 250 cartridges, and come neatly coiled in boxes to prevent jamming. The gun can be fired at the rate of 300 rounds per minute, but 250 rounds per minute is the practical limit due to time lost in changing belts. Firing at this speed, it is equivalent to 40 to 60 riflemen. Without a tripod or mount, a Browning machine gun (.30 caliber) weighs about 40 pounds.

BROWN-SEQUARD, CHARLES EDWARD (1817-94), neurologist and physiologist; b. Mauritius; studied med. in Paris; physician to National Hospital

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for Paralyzed and Epileptic, London (1859); prof. of Physiology and Neuro-Pathology, Harvard (1864); prof. in École de Médecine, Paris (1869); returned to practice in America (1873); prof. of Experimental Med. in Collège de France, Paris (1878); did valuable research on spinal cord, internal secretions, etc.

BROWNSON, ORESTES, AUGUSTUS (1803-76), Amer. socialist and religious writer; pub. *Brownson's Quarterly Review*, 1844-64; praised as philosopher by Comte.

BROWNSVILLE, a city of Texas, in Cameron co., of which it is the county seat. It is on the Rio Grande River and on several important railroads. It has several important public buildings, including a cathedral, convent and United States Government Building. It is opposite Matamoros, Mexico, and has a large trade across the border. In the suburbs is Fort Brown, a post of the United States Army. Brownsville was captured from the Confederates by General Banks, in 1863. Pop. 1920, 11,791.

BROWN UNIVERSITY, a leading collegiate institution situated in Providence, R. I. It was founded by the Baptists at Warren, in 1764, as Rhode Island College, and has since remained affiliated with their denomination, although unsectarian in its teaching. In 1770 the college removed to Providence and fourteen years later it was named as at present in honor of Nicholas Brown, a donor of substantial gifts to the institution. The Revolution interrupted its work and for a time University Hall was used as a barrack and a hospital for American and French troops. The institution's growth became greatly marked during the presidency of Francis Wayland between 1827 and 1855, and its development continued during the tenure of succeeding presidents, specially that of Elisha Benjamin Andrews, from 1889 to 1898. Its Women's College was founded in 1891 and became later recognized as a university department. Under the presidency of the Rev. W. H. P. Faunce, D.D., LL.D., which began in 1899, the institution made marked advances, notably reflected in an enlarged endowment fund (in 1922 it amounted to \$6,452,979) and the erection of new buildings, including the John Carter Brown Library, the Administration Building, the Engineering Building, Caswell Hall, Rockefeller Hall, etc. There is a library of 258,000 volumes. In 1922 there was a student roll of 1648 and a faculty of ninety.

BRUAY (50° 25' N., 2° 15' E.), town, Pas-de-Calais, France; in rich coal-mining district. Pop. 15,000.

BRUCE, BRUS, Scot. dynasty; ancestor came over with Conqueror from Normandy; Robert de Brus received land grant in Yorkshire; branch obtained lordship of Annandale, Scotland; from latter descended Robert de Brus, claimant of Scot. crown, and his sons, Robert I. and Edward Bruce (d. 1318), was assisted in establishing Scot. independence, conquered Ulster, was crowned King of Ireland, 1316, and killed at Dundalk. Robert Bruce's son reigned as David II.; his grandson as Robert II., first of Stewart line.

BRUCE, JAMES (1730-94), Scot. African explorer, author of *Travels*, etc., and archaeologist; discovered source of Blue Nile (1768-70) and (1772) its confluence with White Nile (the true source).

BRUCE, MICHAEL (1746-67), Scot. poet; s. of a weaver; herded cattle as a boy, but received a fair education, and spent some time at Edinburgh Univ.; afterwards became a schoolmaster, and d. of consumption. His best poem, *Elegy written in Spring*, was composed shortly before his death. His well-known *Ode to the Cuckoo* was unjustly appropriated by the Rev. John Logan, who edit. his remains.

BRUERE, HENRY (1882), American investigator and welfare worker; b. St. Charles, Mo. He studied at Cornell University for two years and received the degree of Ph.B. from the University of Chicago in 1901, following which he pursued post-graduate studies at the Harvard Law School, New York University Law School and the School of Political Science at Columbia. He was the organizer and director of the McCormick Works' Men's Club and Technical School, Chicago (1903-5); Director of the New York Bureau of City Betterment (1906-7); Director of the Bureau of Municipal Research (1907-14) and Chamberlain of the City of New York (1914-16), having special charge of the administrative reorganization of the city government. In 1918 he became Federal Director of the U.S. Employment Service for the State of New York. He is advisor to and director in many financial and trust corporations.

BRUGES, city, cap. of Flanders, Belgium (51° 13' N., 3° 14' E.), 63 m. N.W. of Brussels and 8 m. inland from North Sea; connected by ship canal (230 ft. wide and 26¼ ft. deep) with Zeebrugge; flourishing commercial center in 13th cent.; retains mediæval

appearance; fine churches, including Notre Dame; Les Halles; famous belfry, 353 ft. high; chief industry, lace making. Pop. 58,000. In Great War, after fall of Antwerp (Oct. 9, 1914), Belgian and Brit. forces fell back on Bruges, where part of Rawlinson's division which had landed at Ostend was concentrated. Bruges was left an 'open city' and occupied by the Germans (Oct. 14). It was compelled to maintain the Ger. garrison. As an enemy base for submarines, Bruges locks were frequently bombed by Allied airmen (see ZEEBRUGGE). In the final Allied advance the converging movements of Belgian and Brit. forces under King Albert caused the Germans to evacuate the city, which was entered by Belgians in Oct. 9, 1918.

BRUGSCH, HEINRICH KARL (1827-94) Ger. Egyptologist.

BRÜHL, HEINRICH, COUNT VON (1700-63) Ger. statesman; controlled Saxon policy under Elector Frederick Augustus II., being made prime minister, 1746; entirely incapable and corrupt, he brought about disgrace of Saxony.

BRUMAIRE, 2nd month in the Fr. republican calendar (Oct. 22 to Nov. 20) promulgated in year 1793.

BRUMMELL, GEORGE BRYAN, see BEAU.

BRUNEI (4° N., 115° E.), sultanate under Brit. protection, N.W. Borneo; area, c. 4,000 sq. miles; watered by Limbang; produces coal; exports sago. Chief town, Brunel (4° 50' N., 114° 45' E.), with pop. 10,000. People are Malaysians, Kadangans, Chinese, etc. B. was independent state till 1888, when it became Brit. protectorate; administered by Brit. resident since 1906. Pop. 30,000.

BRUNEL, SIR MARC ISAMBARD (1769-1849), inventor and civil engineer; b. Normandy; on account of royalist opinions was expelled during Fr. Revolution; settled in U. S.; established arsenal and cannon foundry at New York; coming to England, 1799, was employed by government in construction of his machine for making pulley blocks; built Thames tunnel, opened 1843, assisted by his son.

BRUNELLESCHI, FILIPPO (1379-1446), Ital. architect; revived the classic style in Italy; most of his great work was executed in Florence, his birthplace, and includes the Pitti Palace, the great cupola of the cathedral of Santa Maria del Fiore, the Capella del Pazzi, etc.

BRUNETIÈRE, FERDINAND (1849-1906), Fr. critic; editor of *Revue des*

BRUNHILD

Deux Mondes; author of *Etudes Critiques* 1880-98; *Historie et Literature*, 1884-86; *Questions de Critique*, 1888.

BRUNHILD.—(1) In Norse myth. a Valkyrie, dau. of Odin, by whom she was thrown into a charmed sleep on Hindarfjell. (2) In the Nibelungenlied, queen of Iceland, who procured the murder of Siegfried, once her lover. (3) A Visigoth princess, wife of Sigbert, king of Austrasia (567).

BRUNI (43° 22' S., 147° 20' E.), island, Tasmania, Oceania; coal.

BRUNIG PASS (46° 47' N., 8° 7' E.), pass leading from Bernese Oberland to Unterwalden. Switzerland.

BRUNN (49° 13' N., 16° 36' E.), town, Czecho-Slovakia, capital of Moravia; formerly fortified; cathedral, several old churches; center of cloth industry. Pop. 130,000.

BRUNO, THE GREAT (925-65), abp. of Cologne; s. of Henry the Fowler of Germany and bro. of Otto the Great.

BRUNO, GIORDANO (c. 1550-1600), Ital. philosopher; b. Nola, near Naples; Dominican friar in youth, but fled to Geneva (1576) on account of religious opinions; proceeded to Toulouse (1579) and to Paris (1580), where he lectured on philosophy and attacked Aristotelians; visited England (1583), where he met Sir Philip Sidney; in 1586, prof. at Wittenberg; returned to Italy, 1592; imprisoned by Inquisition, and burnt as a heretic, in Rome (1600). His philosophy tends towards pantheism, and influenced the thought of Descartes, Spinoza, Schelling, etc.; chief works, *Della Causa Principio ed Uno*, 1584; and *Del Infinito Universo e Mondi*, 1584.

BRUNSWICK, OR BRAUN-SCHWEIG.—(1) Republic of Germany; Harz Mountains in S.; rivers, Ocker, Weser, navigable; beech, fir, pine, oak forests; coal, iron, agriculture, and cattle-rearing important; sugar and chemicals principal manufactures. In early times Brunswick was incorporated in Saxony; became independent duchy (1235); held by Guelphs till death of Duke William (1884), since when ruled by regent, as next heir, Duke of Cumberland, refused to forego his claims to Hanoverian crown; Ernest Augustus succeeded (1913); deposed after Great War, and republic declared (Nov. 1919). Area, 1,424 sq. m.; pop. 494,300. (2) Cap. of above, Germany (52° 15' N., 10° 30' E.); Romanesque cathedral, begun c. 1178; fine Gothic town hall; ducal palace is modern; several museums;

BRUSSELS

formerly great center of Hanseatic League; industries include printing, jute spinning, manufacture of chemicals, machinery, sugar. Pop. 139,540.

BRUNSWICK, a city of Georgia, in Glynn co. It is on the Atlanta, Birmingham and Atlantic, the Atlantic Coast Line, and other railroads and on St. Simon's Sound, 8 miles from the Atlantic Ocean. The city is 8 miles southwest of Savannah. During recent years it has become important as a commercial port. It has an excellent harbor and is connected with New York and Savannah by regular steamship lines. It is the center of export for cotton, phosphates, lumber, turpentine, etc. The city is the seat of the United States Marine Hospital and is a widely known summer and winter resort. Pop. 1920, 14,413.

BRUNSWICK, a town of Maine, in Cumberland co. It is on the Maine Central Railroad, 26 miles northeast of Portland. Its industries include cotton mills, paper mills, and pulp mills. It is widely known as the seat of Bowdoin College (q.v.). Pop. 1920, 7,261.

BRUNSWICK, FERDINAND, DUKE OF (1721-92), Ger. general, served with distinction under Frederick the Great in War of Austrian Succession and Seven Years' War; commanded at Minden, 1759; afterwards made field-marshal.

BRUNSWICK, FRIEDRICH WILHELM, DUKE OF (1771-1815), was 'Brunswick's fated chieftain' of Byron's *Childe Harold's Pilgrimage*; deprived of his duchy by Napoleon, he organized the 'Black Brunswickers,' and was finally killed at Quatre Bras.

BRUNSWICK, HEINRICH JULIUS, DUKE OF (1564-1613), patron of literature and the theatre; was himself a man of multifarious attainments—an able jurist, a clever architect, and a dramatist.

BRUSA, or BROUSSA, tn.; Asiatic Turkey (40° 12' N., 29° 3' E.); silk, cotton, carpets; coal, silver, copper, meerschaum clay; iron and sulphur springs; seat of Gr. and Armenian archbishops; captured by Ottoman Turks 1329; burned by Mongols, 1402; damaged by earthquake, 1855. Pop. 112,000.

BRUSSELS, OR BRUXELLES, cap. of Belgium, prov. of Brabant (50° 52' N., 4° 21' E.); center of canal and ry. system; industries, lace, furniture, bronzes, woolens, cottons, automobiles, leather goods, etc. Modern town is well

laid out, has fine lime-planted boulevards separating it from suburbs, and avenues connecting it with parks and *bois*; older town in center. Important buildings are town hall, magnificent *palais de justice*, royal palace, houses of Parliament, three fine old churches, art and natural history museums, univ.; center of art and music. Various guilds were established in Brussels from 11th cent.; first charter granted in 1312; saw struggles between rival guilds, and execution of Egmont and Horn; thrice burnt; cap. of Austrian Netherlands in 15th cent.; taken by French in 1794, who held it till 1814; became cap. of Belgium in 1830. Pop. (Greater Brussels), 728,900.

During the World War, Brussels was entered by the Germans on Aug. 21, 1914. On the previous day the burgo-master, M. Max, one of the civilian heroes of the war, arranged for the free passage of the enemy's troops through the city, the Germans promising to pay in cash for all requisitions, to respect public and private property, and to uphold the civil administration. A processional entry was made by an army corps, under General Sixt von Armin, composed of all arms, which goose-stepped into the Grande Place. Presently it was announced that Germany had imposed upon the city a war indemnity of \$40,000,000. The valiant M. Max fought hard to preserve Belgian rights, and became so troublesome that he was banished to Germany, being released from captivity after the armistice. The period of Ger. occupation, which lasted for four years, was one of hardship and distress for the inhabitants, whose spirit, however, was not broken. Publication of Belgian newspapers was forbidden, but several secretly printed sheets, notably *La Libre Belgique*, continued to appear, and all the enemy's attempts failed to suppress them or to discover their authors. German zeppelin sheds near Brussels were frequently bombed by Allied aviators, who also dropped leaflets bringing news of the progress of the war. On Nov. 15, 1918, four days after the conclusion of the armistice, there was a mutiny among the Ger. soldiery in the city. Three days later Brussels was cleared of the Germans, and King Albert made a triumphant return to his capital.

Brussels (Sugar) Convention.—An international conference was held in 1898 regarding sugar bounties, and was renewed in 1901, the Indian Government having imposed countervailing duties on bounty-fed sugar. In 1903 a convention was ratified by the powers, except Russia, to suppress bounties, whether direct or indirect, on production

or export. It was renewed in 1907 for five years in a modified form, with Russia's adherence. In 1912 Great Britain, at the instigation of Free Traders, withdrew from the convention which was prolonged till 1918. The outbreak of the World War rendered the convention ineffective.

BRUSSELS CONFERENCES, international conferences: (1) On usages of war, 1874, abortive. (2) To consider exploration and civilization of Africa, 1876; International Association formed; Congo Free State ultimately established. 1922 on Economic Situation of Europe.

BRUSSELS SPROUTS, or *Brassica gemmifera*, is a variety of *B. oleracea*, the cabbage, a cruciferous plant. The main stem of the plant bears numerous lateral leaf-buds in the axils of the leaves, each bud a kind of pigmy cabbage. The sprouts are succulent, and are eaten as a vegetable, coming into season in the autumn.

BRUSILOV, ALEXEI ALEXIVITCH (1853), Russian general; belonged to old Russian noble family; fought in Russo-Turkish War (1877-8), later director of cavalry school for officers at Petrograd; commander of 14th Army Corps (1909). In the World War he commanded the Russian army which invaded Galicia and crossed Carpathians in spring of 1915. After the great retreat of 1915 his army group on the Russian left wing advanced victoriously (June 1916); after the Russian revolution he succeeded Alexeieff (June 1917) as generalissimo under provisional government, and conducted temporarily successful offensive; acknowledged commander-in-chief of the Soviet armies (May 1920).

BRUT, THE TROJAN, legendary Brit. hero. Immediate effect of 'Roman cycle' of romances was Eng. effort to connect England with Roman history; hence Geoffrey of Monmouth (*q.v.*) traces Brit. kings back to Brutus, whom he makes banished descendant of the Aeneas of Homer and Virgil.

BRUTTI, Ital. tribe in classical times; inhabited district now known as Calabria; aided Pyrrhus against Rome, and supported Hannibal; as punishment their territory was annexed by Rome.

BRUTUS, surname of members of Rom. gens Junia. Distinguished representatives were Lucius Junius, who helped to overthrow the Tarquin monarchy and became one of first consuls (509 B.C.), and Marcus Junius (85-42 B.C.), the great patriot of Shakespeare's *Julius Caesar*, taken from Plutarch's

Lives; the latter was deeply loved by Caesar, but joined in his assassination (44); after defeat by Augustus, slew himself at Philippi.

BRUX (50° 31' N.; 13° 37' E.); town; Czecho-Slovakia. Pop. 30,000.

BRUXELLES. See BRUSSELS.

BRYAN, ELMER BURRITT (1865); American educator; b. Van Wert, Ohio. He studied at Indiana, Harvard and Clarke Universities, and subsequently taught at Butler College and Indiana University. Later he was appointed general superintendent of education in the Philippines. He resumed teaching at Indiana University in 1903. Two years later he became President of Franklin College, and in 1909 was called to the presidency of Colgate University. His publications include *Nascent Stages and Their Pedagogical Significance*, 1900; *The Basis of Practical Teaching*, 1905; and *Fundamental Facts for the Teacher*, 1912.

BRYAN, WILLIAM JENNINGS (1860), Amer. orator, journalist, and politician; sprang into note by speeches on bimetallism; thrice nominated for presidency by Democratic party (1896, 1900, and 1908), and thrice defeated; organized volunteer regiment in Span.-Amer. War, but advocated an anti-imperial policy; founded newspaper *The Commoner*, 1901; during tour of the world (1906) his speeches at National Peace Congress, London, and at World's Missionary Conference, Edinburgh, made a deep impression; supported President Wilson's successful candidature (1912), and became secretary of state in Wilson's Cabinet; resigned (1915) owing to difference of opinion on *Lusitania* note; when America entered World War, offered to serve as a private; ardent prohibitionist; pub. *Letters to a Chinese Official*, 1906; *The Old World and its Ways*, 1907; etc.

BRYANT, WILLIAM CULLEN (1794-1878), Amer. poet and journalist; b. Massachusetts; adopted legal profession, which he abandoned in 1829 to become editor of the *New York Evening Post*, with which he was associated for the remainder of his life. He may be regarded as the pioneer of Amer. poets, his first considerable poem, *Thanatopsis*, appearing in 1817. He also trans. Homer's *Iliad* and *Odyssey*; *Poetical Works* (New York, 1903).

BRYCE, JAMES, 1ST VISCOUNT (1838-1922), statesman and man of letters, b. at Belfast; regius prof. of civil law at Oxford (1870); resigned to enter House of Commons (1880). Pub.

in 1862 his famous book, *The Holy Roman Empire*, and immediately stepped into front rank as historical writer. Among other works are his monumental *The American Commonwealth*, 1888; *Impressions of S. Africa*, 1897; *Studies in History and Jurisprudence*, 1901; *Studies in Contemporary Biography*, 1903; *The Hindrances to Good Citizenship*, 1909; *S. America, Observations and Impressions*, 1912. He became under-secretary for foreign affairs in Gladstone's short administration (1886); chancellor of the duchy (seat in cabinet), 1892; president of Board of Trade (1894); went out with government on defeat (June 21, 1895). Has been instrumental in placing many valuable measures on statute book; strenuous supporter of Home Rule; chief secretary for Ireland (1905-6), and in 1907 appointed Brit. ambassador to U.S. a past in which he won golden opinions and promoted cordial relations between the U.S. and the home country; returned in 1913. Held honorary degrees from almost every univ.; in 1902 became one of the first fellows of the Brit. Academy; raised to peerage in 1914; awarded much-coveted Order of Merit.

BRYENNIUS, NIC PHORBUS (1062-1137), Byzantine general, statesman, and chronicler.

BRYN MAWR COLLEGE, a leading institution for the higher education of women, situated at Bryn Mawr, Pa., ten miles northwest of Philadelphia. Its establishment in 1880 was due to gifts from Dr. Joseph Taylor. The college's general scheme of instruction is based on the university model. It offers graduate degrees of A.B., A.M., and Ph.D., and has graduate scholarships open to English, German, French, Spanish, Italian, Swiss and Scandinavian women; also European fellowships enabling graduate students to defray the cost of a year's study in a foreign university. In 1922 the college had 457 students and a faculty of 69 under the presidency of Miss M. E. Parks.

BRYOPHYTA, group of plants which includes two classes—the Liverworts or Hepaticæ, and the Mosses or Musci. As in the Pteridophyta (*q.v.*), the sexual organs consist of archegonia and antheridia, and consequently the two groups are often united as the Archegoniatæ. The antheridia are generally stalked ovoid or globular structures producing a large number of biciliate sperms, whilst the archegonia do not differ essentially from those of the Pteridophyta. There is a distinct alternation of generations, the fertilized

egg producing the sporophyte, which usually consists of an absorptive region, the foot, a stalk or seta, and a specialized capsule which produces the asexual spores. This is always to a large extent dependent on the gametophyte or moss 'plant,' the relative importance of the two generations thus being the reverse of that obtaining in the Pteridophyta.

BRZEZANY, tn.; Galicia (49° 28' N., 24° 57' E.), 30 m. W. S. W. of Tarnopol, on the Złota Lipa; market for agricultural region, and has distilleries and tanneries. In World War was occupied by Russians in Sept. (1914), and evacuated by them towards the end of their great retreat, Aug. (1915). Brusilov's offensive, June to July (1917) reached the outskirts, but the Russians were flung back in disorder.

B. TH. U. OR BRITISH THERMAL UNIT, the unit quantity of heat employed by engineers, is the quantity of heat required to raise temp. of 1 lb. of water from 49° to 50° F.; mechanically equal to 778 ft.-lb. of work.

BUBASTIS, Gk. form of the name of the Egyptian goddess Ubasti, to whom the domestic cat was sacred. The festivals of this goddess were marked by considerable riot.

BUBO, the swelling and inflammation of a lymphatic gland, particularly of the groin, and usually associated with gonorrhoea or syphilis. The chief varieties are: (1) *Simple or sympathetic B.*, one caused by friction or mechanical irritation; this includes what was formerly called *primary B.*, believed to be due to syphilis before the formation of a chancre; (2) *syphilitic*, that which appears in syphilis; (3) *virulent*, an ulcerating variety due to the absorption of virus from a chancre; (4) *indolent*, one which consists of a swelling without discharge of pus; (5) *parotid*, inflammation of the lymphatic gland overlying the parotid; (6) *rheumatic*, a hard lump, usually on the back of the neck, following articular rheumatism.

BUBONIC PLAGUE. See **PLAGUE**.

BUCCARAMANGA (7° 20' N., 73° 10' W.), town Colombia. Pop. 20,000.

BUCCANEERS, or **FILIBUSTERS**, name given to piratical adventurers, mostly French and British, who during the 17th cent. waged informal war on Spaniards and their possessions in W. Indies and adjacent mainland. The term was originally applied to Fr. hunters of San Domingo from their custom of preserving meat on a *boucan*, but later to freebooters of all nations, united in enmity to Spain, whose head-

quarters were at San Domingo and finally at Tortuga. Resentment at monopoly claimed by Spain procured for the buccaneers the connivance of England and France, and at the end of the thirty years, 1665-85, during which buccaneering was at its height, Span. merchantmen were practically swept off the seas. To this period belong the names of Morgan, who sacked Panama, and of Davis, who sacked Leon and terrorized Spaniards in the Pacific. Political changes put an end to buccaneering when England and France became enemies and both sought alliance with Spain. The buccaneers played an important part in the commercial and colonial decline of Spain, and should not be confounded with the pirates who succeeded them (such as Teach), who preyed on all commerce irrespective of nationality.

BUCCINA, ancient Roman musical instrument consisting of a curved brass tube, roughly in the shape of the letter C.

BUCCLEUCH FAMILY. An ancient and distinguished Scottish ducal house, tracing its descent from Sir Richard le Scott (d. 1320), who was famous in the reign of Alexander III. of Scotland. The first of the family to receive the title of B. was Sir David Scott of Branksome, who sat in James III.'s Edinburgh parliament of 1487 as 'Dominus de B.' The Sir Walter Scott of Branksome and B. mentioned in Scott's *Lay of the Last Minstrel* was his grandson, and lived about 1490-1552. He fought in the battle of Pinkie, 1547, and was killed in a skirmish with Sir Walter Kerr of Cessford, in Edinburgh. His great-grandson, bearing the same name, 1565-1611, was warden of the Western Marches, and was raised to the peerage in 1606 as Lord Scott of B. He is celebrated for his rescue of 'Kinmont Willie' from Carlisle Castle, as well as for his services in the Netherlands, and in organizing border bands for foreign service. The title of Earl of B. was bestowed upon a Walter Scott in 1619, who commanded a Netherland regiment against Spain. The first Duke of B. was James, Duke of Monmouth, the illegitimate son of Charles II., who received the title in 1663 on his marriage to Anne, Countess of B. When he was beheaded in 1685 the duchess retained the title in her own right. She was succeeded in 1732 by her grandson, Francis, as second Duke of B. Henry, Duke of B. and Queensberry, 1746-1812, was a friend of Dr. Adam Smith, and rendered great social service to his tenantry by making numerous improvements on the estates. Walter Francis, fifth duke, 1806-84, was noted for the creation of the deep-water

harbor at Granton, near Edinburgh, was lord-lieutenant of Midlothian and Roxburghshire, and captain of the queen's bodyguard in Scotland. His son, William Henry Walter, the sixth and present duke, was born in 1831. See *Fraser's Scot s of Buccleuch, 1878.*

BUCENTAUR (debased from Ital. *bucintoro*), barge in which Doge of Venice, on Ascension Day yearly, wedded the Adriatic; custom commenced about (1000) A. D.; discontinued (1789).

BUCEPHALUS (Gk. *Boukephalos*; ox-head), name of horse of Alexander the Great; many legends have sprung up about it; Alexander built city of Bucephalia (site of modern Dschalapur) on the Hydaspes (Dschelam) to its memory (326 B. C.)

BUCHAN, DAVID (1780-c. 1839). Brit. arctic explorer; perished in search for N. W. passage.

BUCHAN, JOHN (1875); Scottish novelist and historian; born Perth, Scotland. He was educated at Glasgow and Oxford Universities and entered the publishing business, becoming later a member of the firm of Thos. Nelson and Sons. He is a prolific writer, his works including *Musa Piscatrix* (1896); *John Burnet of Barns* (1898); *The Half-hearted* (1900); *The Watcher By the Threshold* (1902); *Sir Walter Raleigh* (1911), and *the Marquis of Montrose* (1913). He also wrote a contemporary *History of the War*, published serially (1914-19).

BUCHANAN, GEORGE (1506-82), Scot. humanist and reformer; had to fly from Scotland (1539), through writing against monastic orders; became prof. of Latin at Bordeaux (where Montaigne was his pupil), and wrote Latin plays, winning fame; imprisoned in Portugal by Inquisition (1551); tutor to Mary, Queen of Scots (1562); tutor to James VI. (1570); wrote democratic political treatise condemned by Parliament and burned by Univ. of Oxford (1579); pub. history of Scotland, valuable as material for his own times (1582). He was a scholar and writer of first rank. *Life*, by Hume Brown (1890), Macmillan (1906).

BUCHANAN, JAMES (1791-1868), the fifteenth President of the United States. He was b. near Mercersburg, Pa., and in 1809 graduated from Dickinson College. After studying law he was in 1812 admitted to the bar. Although he was affiliated with the Federalist Party, he supported the War of 1812. He was elected to Congress in 1820 and

successively re-elected in the following ten years. He took a prominent part in the debates in Congress and became widely known. He was a supporter of Andrew Jackson for the Presidency in (1828), and the latter appointed him Minister to Russia, where he did excellent service in arranging an important commercial treaty between the United States and Russia. He was elected to the Senate in (1834) and served 12 years. His attitude toward slavery was in the main favorable to the institution, while he was in the Senate. Four years following his retirement from the Senate, he was appointed Secretary of State by President Polk. In (1853) he was appointed Minister to England by President Pierce. He was nominated for the Presidency in (1856) largely because of his advocacy of the annexation of Cuba. He selected for his Cabinet chiefly men who favored the secession of the Southern States. He, himself, while holding that the States had no right to secede, announced in (1860) that the President had no right or constitutional power to prevent the States from seceding. His failure to take decisive action made it possible for the seceding States to prepare for war before the government could take means to prevent it. Following his retirement from the Presidency, he supported the Union cause. Buchanan died at Lancaster, Pa. He was succeeded in the Presidency by Abraham Lincoln.

BUCHANAN, ROBERT WILLIAMS (1841-1901), Eng. poet, novelist, and dramatist; his first vol. of verse, *Under-tones* (1863), was followed by many others; *Complete Poetical Works* (1901). Of his numerous novels, *The Shadow of the Sword* and *God and the Man* are perhaps the best. He achieved his greatest success with his original plays and his adaptations of Fielding's novels.

BUCHANITES, followers of Elspeth Stimpson (1738-91), concubine of Robert Buchanan and preacher of communistic Christianity in Scotland.

BUCHAREST, cap. of Rumania (44° 25' N., 26° 7' E.); situated in Wallachian plain, and traversed by Dimbovitza R.; has royal palace, government buildings, state univ., museum, many Greek churches, and charitable institutions; trading center, principally in agricultural produce, timber, and petroleum. Treaty settling boundary question was concluded here by Turkey and Russia (1812); likewise that ending Balkan Wars in (1913). During the World War Bukharest was in hands of Germans (Dec., 1916, to Nov., 1918). Treaty signed here between Rumania and Cen-

tral Powers, (March 7, 1917), was nullified by armistice of November 11, (1918). Pop. 300,000.

BUCHAREST, TREATY OF, drawn up in Bucharest, Rumania, signed August 10 (1913), by representatives of all the Balkan states and Rumania. It brought the Second Balkan War to a close, in which Bulgaria had been opposed by Greece, Serbia and Rumania in combination. The war was brought about by the fact that there came a dispute over the division of the territories conquered by Bulgaria, Greece, Serbia and Montenegro from Turkey during the First Balkan War. Serbia was to have had an outlet on the Adriatic through Albania. Austria-Hungary blocked this arrangement, refusing to allow Serbian expansion in this direction. Serbia therefore demanded more territory in the direction of Bulgaria. Open hostilities broke out before the dispute could be settled by arbitration. Greece and Serbia succeeded in driving back the Bulgarian forces, which were further handicapped by the fact that Rumania took advantage of the situation by invading Bulgaria from across the Danube, taking territory with a population of 270,000. At the conference in Bucharest which drew up the treaty, Bulgaria protested strongly against the terms offered, but finally signed the Treaty. By its terms Rumania retained the territory she had invaded, Greece obtained the greater part of lower Macedonia, and Serbia what was left of the common spoils of the First Balkan War, Bulgaria, though having done most of the fighting against the Turks, emerging with very little more than she had possessed in the beginning. The treaty had evil effects in that an intense resentment was stirred up among the Bulgarian people over the fact that the territories taken by the other three states had large majorities of Bulgarian populations, in consequence of which King Ferdinand found it possible to swing the country over to the side of Germany after the outbreak of the World War, and so bringing about the defeat of the Serbians in their resistance of the Austro-German invasion, a defense which might not have been broken had not the Bulgarians attacked their flank.

BUCHEZ, PHILIPPE JOSEPH BENJAMIN (1796-1865), Fr. writer; helped to form secret society against government (1821); grad. in medicine (1825); expounded a doctrine of 'Christian Socialism'; was pres. of Constituent Assembly (1848); and wrote several important works on history, philosophy, and social science.

BUCHNER, FRIEDRICH KARL CHRISTIAN LUDWIG (1824-99), Ger. philosopher; author of *Kraft und Stoff* (1855), in which he advances theories upon the indestructibility of matter.

BUCHON, JEAN ALEXANDRE (1791-1849), Fr. scholar; traveled extensively in Europe and the East, collecting materials relative to Fr. settlements abroad, which have proved of considerable value to historians.

BUCHTEL, HENRY AUGUSTUS (1847), American clergyman, educator and executive; born Akron, Ohio. He graduated at De Pauw University (1872), and entered the Methodist ministry, serving first as a missionary to Bulgaria and later as pastor of churches in New York, Indiana, New Jersey and Colorado. From (1900) to (1921) he was chancellor of the University of Denver, Colo. He fought against corrupt political conditions in that State and in (1907) was elected Governor on the Republican ticket for a two-year term, at the expiration of which he resumed his duties as University chancellor.

BUCHTEL COLLEGE, a co-education institution in Akron, Ohio, founded under the auspices of the Universal Church. It was established in (1870) and named in honor of John R. Buchtel, one of its chief benefactors, who gave it \$500,000. Since (1914) the college has been known as the University of Akron, following the trustee's gift to that city of the entire establishment and endowment as the foundation for a municipal university, the name of Buchtel College being retained for the College of Liberal Arts. In (1922) its students numbered 785 with a teaching staff of 75, headed by P. R. Kolbe.

BUCK, DUDLEY (1839-1909); Am. organist and composer; born Hartford, Conn. He pursued musical studies in this country and Leipzig, Germany, and on his return from abroad in (1862) was organist successively in churches at Hartford, Chicago, Boston and Brooklyn. For many years he was recognized as the dean of American organists. He has written many cantatas, symphonies and overtures, as well as works of a lighter character. Among his best known compositions are *The Centennial Cantata*, sung at the opening of the Centennial Exposition in (1876), *The Legend of Don Munio*, *The Golden Legend*, *Marmion*, *The Voyage of Columbus* and *The Light of Asia*.

BUCKET SHOPS, offices of brokers who, not being Stock Exchange members, are not allowed to carry out sale

or purchase of stocks or shares, and must employ Stock Exchange brokers.

BUCKINGHAM PALACE, royal residence, London; built (1825), in Georgian style, on site of B. House, Duke of B.'s residence in Anne's reign.

BUCKINGHAM, GEORGE VILLIERS, 1ST DUKE OF (1592-1628), Eng. statesman; introduced to king (Aug., 1614); soon gained favor as successor to Earl of Somerset; app. Cupbearer (Nov. 1614); Gentleman of the Bedchamber and knighted (April, 1615); Master of the Horse (1616); Order of Garter (1616); cr. Viscount Villiers and Baron Waddon (1616); Earl of B. (1617), and Marquess of B. (1618); Lord High Admiral (1619); *m.* Lady Catherine Manners (1620); supported Span. party (1620-22), but after disastrous visit to Madrid (1623) headed popular movement against Spain, and strove for a Fr. alliance. His schemes were interrupted by James's death (1625). B. and Charles were resolved to fight Spain, but their attempts failed disgracefully; Parliament (1625-28) demanded B.'s dismissal, but Charles stood by his minister; B. was assassinated by a discontented subaltern (Aug. 23, 1628) at Portsmouth, while preparing an expedition to relieve La Rochelle. Handsome, insinuating, self-confident, B. was an incompetent, harmful minister.

BUCKINGHAM, GEORGE VILLIERS, 2ND DUKE OF (1628-87); brought up with Charles I.'s children; fought for king in Civil War. Charles II. made him a P.C (1650); app. general of Eastern Association in England (1650); present with Charles at battle of Worcester (1651). Subsequently he returned to England, and *m.* Lord Fairfax's dau. (1657); was imprisoned on suspicion of organizing a Presbyterian plot against government (1657-59). Restored to favor at Restoration, he subsequently succ. Clarendon as chief minister; his tenure of office chiefly marked by scandals and intrigues; forced to retire into private life (1674); joined Opposition; constituted himself the champion of the dissenters, but separated from Whigs on Exclusion question; restored to king's favor (1684), but took no part in public life after James's accession; volatile, insincere man, the 'Zimri' of Dryden's *Abdolom and Achitophel*, and

'In the course of one revolving moon,

Was chemist, fiddler, statesman, and buffoon.'

Wrote occasional verses and satires, and witty comedies, including *The*

Rehearsal (1671), in which he parodied Dryden's manner—Dryden, the poet-laureate, appearing as 'Bayes.'

BUCKINGHAM, HENRY STAF-FORD, 2ND DUKE OF (in the Stafford line) (1454-83); recognized as duke (1465); transferred his support from Richard of Gloucester to Henry Tudor, hence tried and executed (Nov. 2, 1483).

BUCKINGHAMSHIRE (51° 26' to 52° 11' N., 0° 35' to 1° 8' W.), county, England; area, 748 sq. miles; bounded N. by Northampton, E. by Bedford, Hertford, Middlesex, S. by Berkshire, W. by Oxford; surface generally undulating; in S. are Chiltern Hills, which are well wooded, especially with beeches; in center is Vale of Aylesbury, a district noted for dairy produce, ducks, and sheep; drained by Thames, which bounds county on S. and by Ouse, Colne, Thame; there are no large towns; capital, Aylesbury; manufactures unimportant, include straw-plait, wooden chairs, thread lace, paper. Famous school, Eton, is near southern boundary. B. is traversed by Watling Street and other ancient highways; was included in old kingdom of Mercia; saw struggles against Danes; scene of hostilities in Civil War of John's reign; supported Roundheads in Great Rebellion. Pop. 1921, 236,209.

BUCKLE, HENRY THOMAS (1821-62), Eng. historian and student; b. Lee, Kent; traveled on Continent, and in Egypt and Syria; a famous chess player; d. at Damascus (May 1862). B. pub. his great work, *History of Civilization in England* (1857-61).

BUCKNELL UNIVERSITY, a co-educational institution situated in Lewisburg, Pa., established under the auspices of the Baptist Church. It dates from 1846 and, like other institutions similarly endowed, was named in honor of one of the chief contributors to its funds. Its student enrollment in 1922 was 998, and it had a teaching staff of 49 under the presidency of E. W. Hunt, LL. D.

BUCKRAM was once a rich woven cloth, considered especially suitable for church vestments. Thus the Bishop of Exeter, in 1327, presented his cathedral with banners of red and white B. It is wrong, therefore, to picture Prince Hal and Poins who are referred to as 'rogues in B. suits,' in that stiff, wide-meshed stuff of linen or cotton which is commonly called B. today. Its stiffness, due to size, renders it useful for lining belts, collars, bonnets, etc., and also for book-binding. Like 'cunning' and 'gossip,' the word has obviously degenerated in meaning.

BUCKSKIN is a twilled cloth, made of wool, with the nap cropped off very finely. The B. breeches are made of this material. It is also a soft leather made from sheep or deer skin.

BUCKSTONE, JOHN BALDWIN (1802-79), Eng. actor and dramatist; was an admirable low comedian, and a prolific writer of farces, but is chiefly remembered as manager of the London Haymarket theater.

BUCKWHEAT. A grain extensively cultivated in the temperate zone of the northern hemisphere. It is an annual plant, allied to the dock, sorrel and rhubarb. It originated in Asia, becoming known after being transplanted in Spain, as Saracen wheat. Its fruit is used for human food, and for cattle and poultry. It can flourish on poor soil that would not yield a profitable crop of other cereals, but it is sensitive to cold, and the least frost will ruin a crop. As, however, it can be planted as late as May and harvested before the close of August, its successful cultivation escapes the cold season. Many American farmers grow buckwheat chiefly to feed oxen, swine and poultry, or for horse, mixed with bran or chaff. In food it is sometimes used for bread, but more frequently for cakes. Americans specially know buckwheat by the popular griddle cakes that bear its name. The Germans use it as an ingredient for puddings, in cordial waters, and in beer-making. Agriculturally, buckwheat has been found serviceable in not exhausting the soil and in stifling weeds, is inexpensive to cultivate, and can be sown on soil that will produce hardly anything else. The plant rises to a height of three feet, and bees are attracted by its pink, fragrant flower. The principal producing countries are the United States, Canada, France, Germany, Japan, and the more stable portions of European Russia. The annual production in the United States embraces about 14,000,000 bushels over a varying area running to 800,000 and more acres. The crops value in 1921 was estimated at \$11,438,000; in 1919 the value, on a crop of 12,690,000 bushels was \$19,715,000. In 1922, 383,494 bushels of buckwheat grain, valued at \$404,730 and 2,835,626 pounds of buckwheat flour, valued at \$99,713 were exported.

BUCOLICS, name given to the pastoral poetry of the ancient Gk. and Latin poets, and so applied in modern times to similar work.

BUCYRUS, a city of Ohio, the county seat of Crawford co. It is on the Columbus, Sandusky and Hocking and the New York Central and Penn-

sylvania and other railroads. It is the center of an important agricultural and stock raising region and its industries also are important. They include the manufacture of clay working machinery, cranes, steam shovels, automobiles, gas engines, carriages, etc. There is a fine public park, a handsome county building, public library, hospital, etc. Pop. 1920, 10,425.

BUZACZ (49° 4' N.; 25° 23' E.); town, Poland. Pop. 12,000.

BUDAPEST, cap., republic of Hungary (47° 30' N., 19° 4' E.); consists of two towns, Buda and Pest, on opposite banks of Danube, which were united in 1873. Buda (or *Ofen*) is principal seat of government; royal palace and houses of parliament situated here; Pest is commercial center, but contains houses of parliament (completed 1903), univ., museum, and art collections; there are many fine churches, notably the St. Matthias church in Buda, and the Leopoldstadt basilica in Pest. Budapest contains many mineral springs, some of which were known in Roman times, and some splendid baths.

Buda originated in Roman military colony of *Aquincum*; Romans withdrew in late 4th cent. A.D., after which place was successively occupied by Huns, Goths, and other barbarian peoples; taken by Magyars in 10th cent.; ruined by Mongols in 1241; restored by Bela IV.; fell to Turks (1526); became Hungarian cap. (1867); occupied by Rumania for short time in Aug. 1919.

Industries include flour milling, tanning, sugar refining, distilling, manufacture of cutlery, gold and silver goods, tobacco, etc.; trade carried on in corn, wine, spirits, cattle, and famous Hungarian flour. Inhabitants are Germans, Magyars, together with other nationalities. Pop. 880,000.

BUDAUN (28° 2' N., 79° 11' E.); town, United Provinces, India. Pop. 41,000. Budaun (27° 38' to 28° 29' N., 78° 21' to 79° 35' E.), district; area, c. 2,000 sq. miles. Pop. 1,200,000.

BUDDHA, founder of Buddhism (q.v.), was really called *Siddhatha*, though usually described by his family name *Gotama*, or as the *Buddha*—'the enlightened one.' He was s. of *Suddhodana*, a chief of the *Sakya* clan, and was b. probably about 568 B.C. Married at nineteen, he led a life of ease; when twenty-nine fled from home, and became beggar. After temptation by *Mara*, the tempter, he spent six years of most terrible austerities till, worn out, he ceased to inflict penances on himself, thereby forfeiting some of his

followers' admiration. Still he could not satisfy himself, but at last he attained peace of mind meditating beneath a bo tree.

Determined to preach and bring to others the peace he had found himself, B. began by winning back his former disciples. Gotama continued his preaching and teaching for 45 years. At length, on a journey to Kustmāra, north-east of Benares, he lay down to die beneath two sala trees.

BUDDHISM, religion founded by Buddha; widely spread in Asia, though it has never gone beyond. Its main principle is the Middle Path, between self-indulgence and asceticism. The 'Middle' Path is also the Eightfold Path, that is (in the translation of a modern scholar) Right Views, Right Aspirations, Right Speech, Right Conduct, Right Mode of Livelihood, Right Effort, Right Mindfulness, and Right Rapture. Besides this there are Four Truths, that unsatisfied desire is painful, that desire is the origin of suffering, that the removal of pain is the emancipation of desire, and that the way thereto is the Eightfold Path. B. involves belief neither in God, immortality, nor sacrifice. Great emphasis is laid on love. Besides the things to be desired there are Ten Bonds, Five Hindrances, and Four Intoxications which are to be avoided. When a man has conquered himself and guided his life aright in all these, he can attain the *Arahatship*. The three great sins are self-indulgence, ill-will, and stupidity, and the emancipation from these constitutes *Nirvana*.

B. lays enormous emphasis on emancipation in this life, not in the future, rejects the immortality of the soul, but keeps the doctrine of the transmigration. Though no soul really exists, yet the desires possessed in one creature pass on to another in the next life. This doctrine is called *Karma*.

Though writing was known in Buddha's time, his teaching was oral, and was delivered in *sūtras* (formulae). These were gathered together by his disciples, and are all in Pali, the everyday speech of his time (Sanskrit already being a dead language). A large number of works relating to B. were written at various times within six cent's after Buddha's death; many not yet printed.

B. spread in India, but there was a reaction towards Hinduism, and now B. is almost extinct except in Nepal. Ceylon is Buddhist. It is also the religion of Further India, and Lamaism, the religion of Tibet, is a corrupt form. B. one of the religions that have exerted most influence on the world, now numbers more adherents than any

other faith except Christianity, but it does not seem likely to influence Europe much.

BUDE, GUILLAUME, BUDÆUS, (1467-1540), Fr. scholar; was a prolific writer both in Gk. and Latin, and was much esteemed by Francis I. and Erasmus; did much to promote the cause of learning, and was one of the founders of the College de France.

BUDGE, SIR ERNEST A. WALLIS, English Oriental scholar and archaeologist. He graduated at Christ College, Cambridge, turned his attention to archaeological research and headed expeditions that made important discoveries at various sites in Egypt and Mesopotamia. He has charge of the Egyptian and Assyrian antiquities in the British Museum. He has written extensively on hieroglyphs and other matters pertaining to archaeology. One of the best known of his works is that on *Assyrian Incantations*, published in 1878. He published *Seven Tablets of Creation*, 1921; and *Guide to Egyptian Room, British Museum*, 1922.

BUDGET (O. French, *bougette*), the financial statement annually made in House of Commons by Chancellor of Exchequer. The 'Budget' obtains in Brit. colonies, Brit. India, and, in modified forms, in France, U.S.A., and elsewhere. The term also indicates a small coffer, and thus is used for a dispatch-box containing official papers.

BUDGET SYSTEM, UNITED STATES. The first budget of the United States was submitted to Congress in December, 1921, under a new system of conducting the government's finances created by a law passed that year. The United States Government thus came into line with those of other leading countries in systematizing its financial operations by first preparing a public balance sheet. Hitherto, owing to the division between the legislative and executive branches of the government, the United States had no budget system as it is understood abroad. In Great Britain the method followed is the submission to Parliament by the Chancellor of the Exchequer of estimated receipts and expenditures accompanied by proposals whereby they can be met, and that official only presents necessary financial legislation to this aid. In the past Congress received annually similar statements from the Secretary of the Treasury, but the latter had no power to formulate plans for revenues and expenditures, which were entirely in the hands of Congress. His estimates were purely formal and merely served as a founda-

tion for appropriation bills. They were executive recommendations regarding appropriations which Congress heeded or otherwise, according to its temper. The new budget system was framed to displace all this by curbing the extent to which Congress can go in voting money. It embraced an independent audit of government accounts and provided machinery for improving the methods of the spending departments of the government and for effecting economies. As yet, however, it is regarded as only a beginning of a genuine executive budget system. It is in the hands of the Bureau of the Budget, the first Director of which, Charles D. Dawes, is credited with the system's inception. The Bureau established a number of co-ordinating agencies, namely, a Federal Purchasing Board; a Federal Liquidation Board; a Corps Area Organization for handling army purchases and supplies; a Surveyor General of Government Real Estate; a Federal Motor Transportation Agent; a Federal Traffic Board to overlook the government's annual transportation bill, and other offices. The Director-General in 1923 was Gen. Hubert M. Lord. In the case of States and municipalities, a uniform budget system is lacking generally, and the practice of such administrations therefore varies widely. The governor of a State has authority to report to the legislature regarding finances and to make recommendations, but no governor attempts to do so in the form of a budget. There is a growing movement among the States, as well as in cities, for securing methods of greater efficiency in the conduct of public finances by the creation of budgeting systems.

BUDINI, ancient race, who inhabited district in S.E. of European Russia.

BUDRUM (37° 4' N., 27° 26' E.), port, Turkey-in-Asia; site of ancient Halicarnassus (q.v.). Pop. c. 6,000.

BUDWEIS (48° 59' N., 14° 28' E.), cathedral town, Czecho-Slovakia; commercial center. Pop. 50,000.

BUEL, CLARENCE CLOUGH (1850), American author and editor; b. Laona, N. Y. He was engaged in newspaper work on the New York Tribune from 1875 to 1881. In the latter year he became a member of the staff of the Century Magazine. In 1883 he collaborated with Robert Underwood Johnson in the editing of articles bearing on the *Civil War*, which were afterward published in book form under the title *Battles and Leaders of the Civil War*, 1887. He was associate editor of the

Century Magazine from 1909 to 1918 and advisory editor until 1914.

BUELL, DON CARLOS (1818-98), Amer. Federalist general.

BUENOS AIRES. — (1) Prov., Argentina, S. America; surface is plain, crossed by many streams and dotted with lakes; chief industry, sheep and cattle raising; produces cereals, tobacco, fruits; exports butter, wool, wheat, jerked beef; cap. La Plata. Area, 117,800 sq. m.; pop. (not including town of Buenos Aires) 1,800,000. (2) Cap. of Argentine Republic (34° 40' S., 58° 25' W.), and largest city in southern hemisphere, on r. bk. of La Plata R.; extensive docks; terminus of many railways; great manufacturing town and center of inland trade; manufactures cloth, carpets, furniture, cigars, boots, shoes, city regularly laid out, with fine squares and parks; large cathedral and archiepiscopal palace; other important buildings are government house, exchange, state library, univ., opera house. City was finally established by de Garay in 1580, after two unsuccessful attempts at settlement by earlier Span. colonists. Docks have been greatly enlarged of recent years and channel to mouth of river deepened. Pop. (est.) 1,500,000.

BUFFALO, *Bubalus*, genus of ruminants, belonging to the same family (*Bovidae*) as the ox; includes two principal species: the Indian B. (*B. buffelus*) is indispensable as a powerful beast of burden and for traction and domestic purposes. They have a preference for marshy ground, which they frequent. Domesticated herds have been introduced into Italy and Greece. The Cape B. (*B. caper*) occurs in large herds in Central and S. Africa, and is very powerful and dangerous when wounded, and not to be domesticated. The base of the horns forms a thickening which is practically bullet-proof. See Bison.

BUFFALO, co. seat of Erie co., New York, founded under the name of New Amsterdam in 1801-2 by Joseph Ellicott, agent of the Holland Land Company, slopes upon the north-eastern extremity of Lake Erie. Until 1810 it retained its original name; tradition derives its present name from the herds of buffaloes that used to frequent the Buffalo Creek region. The greater probability, however, is upon the side of its derivation from the name of an Indian chief. All but destroyed in 1813 by a British, Canadian, and Indian force, it rose to the rank of a city in 1832. With the completion of the Erie Canal in 1825, B. rapidly advanced into the forefront of commercial importance. It has direct

passenger and freight connection with the great ports of the lakes and is directly connected with the Atlantic by the New York State Barge Canal. It distributes the manufactured products of the E. to the W., and the raw products of the W. to the E.; it is the port of entry of the Buffalo Creek customs dist. It is among the principal grain and flour markets of the world. In B. was constructed by Joseph Dart in 1843 the first steam grain elevator in the U.S. Its horse market is the greatest in America, its millions of head of livestock, its immense annual receipts of lumber and fish, its iron ore and coal are eloquent evidence of its wealth. Among its manufactures are foundry and machine shop products, automobiles, airplanes and motors, aniline dyes, linseed oil, cars, and shop construction, soap, flour and grist mill products, lumber and planing mill products, clothing, iron and steel products. And among its industries are meat-packing, petroleum refining, brick, stone, and lime working, harness-making, lithographing, the making of patent medicines and chemicals, copper smelting and refining. Its altitude, temperate climate, excellent drainage and water supply make B. an attractive residential city. Buffalo is beautifully laid out with spacious streets, most of which are bordered with trees, and with squares, and is encircled by 1200 acres of parks linked together by boulevards and driveways. In 1901 the northern portion of the largest of these, Delaware Park, was enclosed in the grounds of the Pan-American Exposition where, in its temple of music, President McKinley was assassinated on Sept. 6 of that year. Its public and office buildings are upon a magnificent scale. There is a Civic Center with magnificent buildings. Pop. 1920, 506,775. Est. 1923, 536,718.

BUFFALO BILL. See CODY, WILLIAM FREDERICK.

BUFFIER, CLAUDE (1661-1737), Fr. philosopher; attached to the Jesuit College at Rouen for the greater part of his life; evolved a system of philosophy which won Voltaire's commendation.

**BUFFON, GEORGE LOUIS LEC-
LERC, COMTE DE** (1707-88), Fr. naturalist; b. Montbard (Burgundy); early abandoned law for natural science; app. member of Academy and Keeper of Jardin du roi (1739); enjoyed favor of Louis XV. and XVI.; produced with assistance of Daubenton his great work, *Histoire Naturelle*.

BUG.—(1) (c. 52° 45' N., 22° E.), river, Austria and Russia. (2) (46° 58' N. 32° E.), river, Russia.

BUG, a general name for any member of the insect order Hemiptera (q.v.); or particularly the bed-bug (*Cimex lectularius*), a flat, wingless semi-parasite found only in human dwellings, although related species occur in bats and birds.

BUGASON (11° 10' N., 122° 30' E.), town, Philippines. Pop. c. 14,000.

BUGEAUD DE LA PICONNERIE, THOMAS ROBERT (1784-1849), Fr. soldier; served in Napoleonic campaigns; became a field-marshal (1831); won distinction in Algeria, being gov.-gen. (1840-46); marshal of France (1843); became Duke of Isly (1844); commanded army of Alps (1848-49).

BUGGY, light four-wheeled conveyance used in America and Australia for traveling over rough ground.

BUGIS, a Malayan people of Moham-medan faith, inhabiting Celebes and other portions of the Malay Archipelago; governed by a native king, they are brave and fierce in disposition, practise agriculture, and drive flourishing trade in native products.

BUGLE.—(1) A wild plant, bearing a blue flower. (2) A longish black bead used in dress ornamentation.

BUGLE, treble brass or copper wind instrument with cup-shaped mouth-piece, used in military service. During the XVIII. cent. it superseded the drum in Eng. infantry regiments as a signal instrument, and eventually ousted the cavalry trumpet. There is also a keyed instrument known as the 'Royal Kent Bugle,' which, however, has now given place to the cornet. The b. is a very ancient musical instrument, and originally was made of a bull's horn—hence the term 'bugle-horn.'

BUHR STONE, variety of quartz; a siliceous or siliceo-calcareous stone much used as millstones.

BUILDING, the name given to the art of erecting houses, public edifices, shops, etc., which, besides the architect who designs the structure, is the work of various craftsmen such as the mason, bricklayer, carpenter, joiner, plumber, painter, and glazier. Though the architect delegates the manual work to a builder, it is requisite that he should have a thorough knowledge of building construction, drainage, and other matters; that he should understand the kind of foundation required from an examination of the soil; be fully acquainted with the by-laws governing the erection of buildings, with regard to height, spacing, materials used, and numerous other necessary details; and, in short,

be fully competent to supervise the work of the builder. In choosing a site for the erection of a building, 'made' ground — (i.e.) land which has at some time been artificially filled in—should be especially avoided, likewise marshy ground, a dry subsoil, with natural drainage, being the most suitable for building purposes. Even when a site with a dry soil has been chosen, the builder frequently lays a foundation of concrete, which is not only calculated to give greater stability to the superstructure, but also serves to protect the building from the effects of damp.

BUILDING AND LOAN ASSOCIATIONS, co-operative organizations which have as their object the building of homes for their members through co-operation in financial assistance. They are distinctively of American origin, the first society of this kind being formed in Philadelphia, Pa., in 1831, known as the Oxford Provident Building Association. It was not till after the Civil War, when the settlement of the Middle West began in earnest, however, that the associations took on a vigorous life as an institution, especially in the cities of St. Paul and Minneapolis, where whole areas of the residential portions of the communities were built on this plan. The scheme is a primitive form of consumers' co-operation. A local club is formed, each member buying one or more shares, for which he pays on the installment plan. When enough money has been accumulated in the treasury for building a house, it is auctioned off as a loan to the members, the highest bidder obtaining it, the premium going to the organization's treasury. The money is not usually given over the borrower, however, but, on his behalf, the society makes arrangements with the building contractor and pays him as the building proceeds, holding a mortgage on the house until the debt has later been repaid. Membership is open continuously to all comers of good character, so that the shares always remain at par, as in any consumers' co-operative society. The advantage of the building and loan association over a bank is that the members are well acquainted with each other and in position to judge a borrower's integrity better than a bank official, and thus moral character counts for quite as much as financial standing. Within recent years, and especially in Massachusetts, these associations have extended their operations further, becoming general credit unions, lending members' money for other purposes than building homes. It is therefore difficult to draw the line between a building and

loan association and a credit union, especially as the laws which are passed for their incorporation usually cover the credit union aspect as well, giving the societies a wider range. This American plan was widely imitated in Europe, but more especially in England, where it was considerably developed, the famous 'garden cities' being the result. Abroad, however, title to the houses built usually remains in the hands of the society as a whole, the houses being rented to the members at cost price. There has been a vigorous growth of the institution in this country, especially during the recent years of high prices for building and building materials. The societies continue to remain local in character, and efforts at federation remain weak. The United States League of Building and Loan Associations was founded in Cincinnati, in 1892, but only 260 delegates attended its convention in 1922, whereas there are about 10,000 local associations in the country, with total assets of over \$2,000,000,000. In England federation has been more successful, with the results that the central organization is able to manufacture and import building materials and maintains a staff of first class architects, all of which further reduces expenses.

BUILDING STONE, material for building, which must be durable, yet easily worked. The stone used for building may be classified under three heads: crystalline, calcareous and fragmental. Of the first granite stands chief and almost alone. The second includes limestone and marble. The third is chiefly represented by slate. Of all these granite stands first in its hardness and ability to withstand frost, but until lately it was not much used on account of the difficulty of working it. The invention of effective granite cutting machinery, however, has made it one of the most popular materials, especially where endurance is desired. It is quarried in most of the eastern states, within the Appalachian regions, from Maine to North Carolina, but it is also found in California, Montana, Wyoming, Minnesota, Wisconsin and Missouri, but the largest supply is from Maine and Massachusetts. Limestone, though strong, lacks the hardness of both granite and marble and is quarried chiefly in Indiana and Kentucky, the 'Bedford stone' being especially desirable. It is found in many shades of color; pink, red, yellow, green and blue. Marble is of all stones the classic building material, having been used in the construction of public buildings and royal palaces since the days of antiquity. In the United States the supply comes

chiefly from the state of Vermont, where 60 per cent. of the total output is quarried. There it is found in almost all colors; from dark green to dark blue; beautifully veined and mottled. In Tennessee much marble is also quarried, of a beautiful chocolate and red. Much marble has been discovered in the Rocky Mountain regions, but so far little quarrying has been done there, on account of the lack of transportation. Sandstone is the least favored of the chief building materials. It comes in grains as fine as grind stones to stone so coarse that large pebbles are visible. In color it varies from gray, to buff, blue, brown and red. It is chiefly quarried in Oregon, Connecticut, New York, Ohio and Massachusetts. Slate is almost exclusively used for roofing, and is found chiefly in Maine, Vermont, Pennsylvania and New York.

BUKHAREST. See **BUCHAREST.**

BUKOVINA, former duchy and crown-land, Austria, now part of Rumania (48° N., 25° 30' E.); great part occupied by Carpathian Mts.; fertile, extensive forests; chief trade, cattle, grain, wool, agricultural produce; cap. Czernovitz. Mixed population, leading nationalities Ruthenian, Rumanian; ceded to Austria (1777); incorporated with Galicia (1786), but made separate crown-land (1849); ceded to Rumania after World War.

BULACAN (15° N., 120° 58' E.), town, Luzon, Philippines; chief products, minerals, sugar, rice; destroyed by fire, 1898. Pop. 15,000.

BULANDSHAHR (28° 24' N., 77° 54' E.), town and district, India, in Meerut division of United Provinces; district intersected by Ganges; canal, which is navigable and also irrigates land; chief center of trade, Khurja; exports indigo, cotton, wool, and cereals. Pop. c. 19,000.

BULAWAYO (20° 10' S., 28° 40' E.), town, capital of Matabeleland, S. Rhodesia, S. Africa; lies in fertile district, rich in minerals, gold principally. Pop. 4,000.

BULBUL, name given on account of their call to several common Indian garden-birds of family *Timeliidæ*; and also to the Persian Nightingale, *Daulias*.

BULDANA (c. 20° 32' N., 76° 14' E.), town and district, S.W. Berar, Central Provinces, India; rich in agricultural produce; well watered; exports, cotton and grain; area (district), 2,809 sq. miles. Pop. 430,000.

BULDUR, BURDUR (36° 50' N., 30°

7' E.), town, Konia, vilayet Asia Minor; chief industries, linen-weaving and leather-tanning.

BULFINCH, CHARLES (1763-1844), Amer. architect; succ. Latrobe as architect of the Washington Capitol; exercised considerable influence on Amer. arch.

BULGARIA, kingdom, Balkan Peninsula, S.E. Europe (41° 15'-44° N., 22° 10'-28° E.); bounded N. by Danube, E. by Black Sea, S. by Macedonia and Thrace, W. by Serbia; includes E. Rumelia. Bulgaria is drained by Maritza and affluents of Danube; crossed by Balkans and Rhodope Mts. In N. between Tirnova and Rustchuk are grass-covered plains, dotted with thousands of tumuli or burial mounds, which are also found on plains near Philippopolis. Country is almost entirely agricultural, about five-sevenths of population engaged on land. Wheat, the principal product, is largely exported; wine, tobacco, silk also produced. Minerals include coal, iron, gold, silver, lead, manganese, copper. Chief manufactures are attar of roses (at Kezanlik), woolsens, cottons, cigarettes; there are breweries, distilleries, filigree works, sugar-refining works; fisheries in Danube and Black Sea; imports, textiles, metal goods, machinery, petroleum, leather, etc.; exports, cereals, live stock, attar of roses, rice, silk, wine, tobacco, eggs, skins; railway mileage, 1,845. Inhabitants are mainly Bulgarians proper, with considerable number of Turks; principal religion, Gr. Church. Education is compulsory. Most important towns are Sofia (cap.), Tirnova (old cap.), Philippopolis (cap. of E. Rumelia), Varna and Rustchuk (ports), Slivno (manufacturing city). Area, c. 42,000 sq. m.; pop. 5,500,000.

History.—Early history is obscure; peopled by Thracio-Illyrian tribes, who were subdued by Philip and Alexander of Macedon; annexed by Vespasian, and became Roman prov. in 1st cent. A.D. About A.D. 328 the country was overrun successively by Goths, Huns, and other tribes, of whom the most important were Slavs, who settled here between 3rd and 7th cents. Later in 7th cent. the *Bulgari*, an Asiatic tribe, appeared. Boris I. became Christian (864), and encouraged spread of Christianity in Bulgaria. Gr. emperor, Nikephorus, tried to conquer Bulgaria c. 965, and was aided by Russians under Sviatoslav, who later (969) again invaded country, with some success at first, but was ultimately expelled.

Soon after this Boris II. of Bulgaria was deposed by Greeks, who annexed country in 1018. Bulgaria remained sub-

ject to Byzantium till 1186 when Bulgarians rose in revolt and founded Asenide dynasty, which lasted for two centuries, attaining greatest power under Asen II., 1218-41. Turks subdued whole country and established Ottoman rule, 1389, which lasted for about four centuries. The Bulgarians seem to have been treated with great cruelty and injustice. From about middle of 18th century, through influence of Bishop Sophronius, a revival of literature and education began.

In 1876 occurred the *Bulgarian Atrocities*, when over 15,000 Christians were massacred by Turk. troops with utmost cruelty. By Treaty of Berlin (1878) Bulgaria was constituted as an autonomous and tributary principality, under Sultan's suzerainty; a prince was to be elected by the people. E. Rumelia was by this treaty also made largely autonomous, and was to be ruled by a governor named by Sultan. Alexander of Battenberg was chosen as first prince of Bulgaria (1879), while Prince Vögörides became first governor of E. Rumelia. He was succeeded by Gavril Pasha Krestovich, during whose governorship the two states were united. About same time Serbia declared war on Bulgaria; Serbians were ultimately driven back and peace was concluded. In 1887 Prince Ferdinand of Saxe-Coburg-Gotha was chosen as second prince of Bulgaria; independence of Bulgaria was recognized by powers (1909), when Prince Ferdinand became tsar. In Balkan wars (1912-13) Bulgaria gained territory. In 1915 she joined Central Powers, but surrendered unconditionally to Allies on Sept. 29, 1918. See SALONICA; SERBIA. By Treaty of Neuilly (Nov. 27, 1919) she renounced all claims to Macedonia and Thrace. Ferdinand abdicated on Oct. 4, 1918, and was succeeded by his son, Boris III.

The Treaty of Neuilly was decreed to go into effect on October 1, 1921, but this was not found practical because its terms required the abolition of compulsory military training, the reduction of the army to 20,000 and other restrictions. The work of disbanding the former army continued during 1921, and by autumn of that year none was left under arms. The treaty provided, however, for the raising of a police force and frontier guards and this was carried on during this and the following years. The Minister of War, Alexander Dimitroff, was assassinated on October 22, 1921. Threatened hostilities between Turkey and the Great Powers, in 1923, created some uneasiness in the attitude of Bulgaria in the event of the outbreak of war. The continuance in office of the

Prime Minister, Stambuliski, gave assurance, however, that a conservative attitude would be maintained. The country in general revived from the effects of the war, although there was great dissatisfaction among the people due chiefly to industrial conditions and the loss of territory as a result of the Treaty of Neuilly. A revolution in June, 1923 resulted in the overthrow and assassination of Stambuliski. See NEW STATES OF S. E. EUROPE.

BULKHEADS. See SHIPS.

BULKELEY, MORGAN GARDNER (1838-1922), American legislator and executive; b. East Haddam, Conn. At an early age he engaged in business in Brooklyn, N. Y., and at the outbreak of the Civil War enlisted in the 13th New York regiment as a private, serving with credit through the Peninsula campaign. In 1872 he went to Hartford, Conn., organized the United States Bank in that city, and in 1879 was chosen president of the Aetna Life Insurance Co., which office he retained until his death. He engaged actively in Republican politics, was elected Mayor of Hartford four times (1880-88) and in 1889 was chosen Governor. He served as United States Senator (1905-11). He was chairman of the Connecticut Highway and Bridge Commission and was identified as a director with many banks and commercial organizations.

BULL.—(1) Edict of Pope with leaden seal (*bulia*) attached. (2) Irish bulls are seriously made statements containing contradictory terms, with ludicrous effect. (3) One who agrees to buy stock, hoping that, by settlement time the price having risen, he may sell at a profit.

BULL, JOHN, humorous impersonation of the collective English people, conceived of as well-fed, good-natured, justice-loving, and plain-spoken; designation derived from Arbuthnot's satire, *The History of John Bull*.

BULL, OLE BORNEMANN (1810-80), Norweg. violinist; first professional appearance in Paris (1832); afterwards toured Italy, England, and America with immense success.

BULLARD, ARTHUR (1879), 'Albert Edwards,' American author; b. St. Joseph, Mo. He studied for two years in Hamilton College, N. Y., and then engaged in newspaper work. For some years following 1906, he acted as foreign correspondent for Harper's Weekly, Collier's Weekly and the Outlook, traveling in Russia, Central America and North Africa. He represented the

Outlook in the Balkan wars of 1912-13. For the next three years he was the European correspondent for the Outlook, Century Magazine and Atlantic Monthly. He was at Vladivostok, Siberia, with the American forces in 1918-19. Among his publications may be cited *A Man's World*, 1912; *Comrade Yetta*, 1913; *Diplomacy of the Great War*, 1915; *The Russian Pendulum*, 1919; *The Stranger*, 1920; and *A. B. C. of Disarmament and Pacific Problems*, 1921.

BULLARD, ROBERT LEE (1861), an American soldier; b. in Youngsboro, Ala. He graduated from the U.S. Military Academy at West Point, in 1885. During the Spanish-American War he saw active service, first in Cuba, then in the Philippines, and during 1902-4 was civil governor of a Moro province. During the war against Germany he first had command of the 2nd Brigade of the 1st Div. of the American Expeditionary Forces. Later, in 1918, with the rank of major-general, he took command of the 2nd Army Corps, operating in France and Luxembourg. It was he who wrote the famous message, at the opening of the second Battle of the Marne, ending with 'we are going to counter-attack.'

BULLARD, WILLIAM HANNUM GRUBB (1866), an American naval officer; b. in Media, Pa. He graduated from the U.S. Naval Academy, at Annapolis, in 1886, served during the Spanish-American War, and during the war against Germany, with the rank of rear-admiral, had command of the division of American battleships which formed part of the British Grand Fleet. Toward the end of the war he had command of the U.S. naval forces in the eastern Mediterranean, and as such received the surrender of the Austro-Hungarian ships. Since 1921 he has been in command of the Tungst Patrol Force, attached to the U.S. Asiatic Fleet.

BULL DOG. See DOG FAMILY.

BULLEN, ANNE. See BOLEYN ANNE.

BULLEN, FRANK THOMAS (1857-1914), Eng. writer of sea stories; served before the mast as a boy; junior clerk in Meteorological Office; his books include *The Cruise of the Cachalot*, *The Call of the Deep*, *A Son of the Sea*, *With Christ at Sea*.

BULLER, SIR REDVERS HENRY (1839-1908), Brit. general; member of old Cornish family; distinguished himself in Kafir and Zulu wars and in Sudan; app. commander-in-chief of

South African Field Force for Boer War (1898); repulsed at *Colenso*, and superseded by Lord Roberts, but as commander of Natal army finally relieved Ladysmith.

BULLET. See AMMUNITION.

BULL-FIGHTING, the Span. national sport since the XI. cent., in which some of the earlier kings used to take part. A modern bull-fight is divided into three parts. After the formal parade around the arena of all those about to take part in the spectacle, the bull is let loose in the ring, and having been already infuriated, he attacks the *picadores* (mounted upon blindfolded horses), who are armed with short-pointed lances. The bull almost invariably disembowels the horses, which are afterwards dragged out, and the *picadores* endeavor to weaken the creature by repeated thrusts with their weapons. The next stage is that of planting darts in the bull's neck by the *banderilleros*; and the final act is the stabbing of the beast to the heart by the *matador*, armed with a short flat sword. It is estimated that from 5,000 to 6,000 horses and about 1,300 bulls are slain annually in Spain in connection with these spectacles.

BULL FINCH. See FINCH FAMILY.

BULL FROG. See FROGS.

BULLHEADS (*Catfish*), small, large-headed, large-finned, tapering fishes found in shallow water and chiefly in Northern seas. A few inhabit fresh water. The miller's thumb, a prickly little fish common beneath stones in streams; the sea scorpion; the father-lasher; and the four-horned b.

BULLINGER, HEINRICH (1504-75), Swiss Reformer; friend and successor of Zwingli; assisted in drawing up Helvetic Confession; friend and correspondent of Lady Jane Grey.

BULLOCK, SHAN (1865), Irish nov., author of *The Awkward Squads*, *The Ring o' Rushes*, *The Red Leaguers*, *Hetty*, etc.; his novels are keenly observant studies of Irish life, full of a kindly humor.

BULL-ROARER, Eng. plaything, consisting of a flat strip of wood (8 in. by 4), bored at one end for a string to be passed through, which, when whirled round in circles, produces a roaring sound. A similar object is used by the Australian aborigines and other primitive races (called 'tundun') in their heathen ceremonies.

BULL RUN, a small stream in north-

eastern Virginia, which gave its name to two important battles of the Civil War. The First Battle of Bull Run was fought on July 21, 1861, between 29,000 Union soldiers under Gen. McDowell, and 28,000 Confederates under Beauregard and Johnson. Both armies were made up of raw recruits, but among the Confederates were a large number of Texas frontiersmen, especially proficient in handling the Bowle knife. When these elements came into close quarters, the Union soldiers, though equal in numbers, became completely demoralized and broke and fled from the field in a panic, no attempt to reform being made till the outskirts of Washington, D. C., were reached, thirty miles away. This disastrous blow to the Union cause may be said to have altered the status of the war in the eyes of Europe, from a mere rebellion, to a civil war. The Second Battle of Bull Run was fought during Aug. 29-30, 1862, between 50,000 Confederates under General Lee and 70,000 Federals under Pope. At the end of the first day's fighting neither side could show important gains, but after the fighting on the following day the Federal Army withdrew, with a loss in killed and wounded of about 14,500, the Confederates losing less than 10,000. This victory enabled Lee to invade Maryland.

BULLS AND BEARS. In the slang of the Stock Exchange 'Bulls' are men who have nominally bought stock, but with no intention of paying, hoping to sell again at a profit before long. 'Bears,' on the contrary, are men who have sold stock which they do not possess, hoping that a fall in prices will enable them to buy at a profit.

BULL-TROUT. See under SALMON FAMILY.

BÜLOW, BERNHARD HEINRICH KARL MARTIN, PRINCE VON (1849), Ger. statesman, was b. at Klein Flottbeck, Holstein. In 1873 he entered the diplomatic service, and in 1878 was secretary of the Berlin Congress. He was successively first secretary of the embassy at Paris (1880) and at Petrograd (1883), minister at Bukharest (1888), and ambassador at Rome (1893-7), when he was appointed Prussian minister of state, and was made count in 1899, after the acquisition of the Caroline and Marianne Islands. In the following year he became chancellor of the German Empire and prime minister of Prussia, in succession to Prince Hohenlohe. He was supported in the Reichstag by the 'bloc'—a combination of Conservatives, National Liberals, and Center. He resigned in 1909 in con-

sequence of the rejection by the Reichstag of the Government Inheritance Tax Bill. In June 1905 he was raised to the rank of prince. After the outbreak of the World War he acted as the Ger. ambassador at Rome, but failed to prevent Italy's intervention in the war (June 1915). He retired to Switzerland and was active in peace intrigues. He pub. *Imperial Germany*, 1912; and *Memoirs*, 1913.

BÜLOW, DIETRICH HEINRICH, COUNT VON (1757-1807), Ger. writer; bro. of the field-marshal; lost opportunities by attacks on existing institutions; pub. *Geist des neueren Kriegssystems*, 1805; and followed it up with military works on same lines, from which Prussia learnt much.

BÜLOW, FRIEDRICH WILHELM, FREIHERR VON, COUNT OF DEN-NEWITZ (1755-1816), Pruss. general; cr. count for great victory at *Dennewitz* 1813; repelling Napoleon; took part in invasion of France (1814); made celebrated charge at Waterloo.

BÜLOW, HANS GUIDO VON (1830-94), Ger. pianist and conductor; abandoned law for music, and studied under Hauptmann, Liszt, and Wagner. He was a pianist of the first rank, and obtained fame throughout Europe and America as a masterly conductor. He married the *dau.* of Liszt, but the union was afterwards dissolved, and the lady married Wagner.

BÜLOW, KARL VON (1846-1921), Ger. field-marshal, member of distinguished Prussian family; served in Franco-Prussian War; became quartermaster general (1902) and general of infantry (1904). At outbreak of World War commanded 2nd Army; and on Sept. 9, 1914, in Moltke's name, ordered retreat of 1st Army, which led to whole Ger. retirement to the Aisne (see MARNE, BATTLES OF). Afterwards held a command in the Artois, but retired owing to ill-health during winter of 1914-15. In 1920 pub. *Mein Bericht zur Marneschlacht*.

BULRUSH. (1) So-called true bulrush is *Scirpus lacustris*, a member of sedge family (Cyperaceæ), native in Europe, Asia, and N. America; is about four feet high and is used extensively in making cane chairs, etc. (2) More commonly applied to *Typha latifolia*, which together with bur-reed (*Sparganium*) constitutes the Typhaceæ; more correctly to common great reed mace, found practically all over the world on margins of ponds, etc.

BULSTRODE, SIR RICHARD (1610-

1711), Eng. cavalier and author; joined Charles I. at outbreak of Civil War; was employed abroad by Charles II., and shared in the exile of James II. His *Memoirs* (not pub. till 1721) contain much valuable hist. matter.

BULWER, SIR HENRY.—WILLIAM HENRY LYTTON EARL BULWER, BARON DALLING and BULWER—(1801-72), Eng. diplomatist; s. of General William Earle B., and bro. of the novelist Edward (Lord Lytton); won distinction as *attache* at The Hague during revolt of Belgium, and establishment of independence, under Leopold I.; became *charge d'affaires* at Brussels; helped new government and wrote brilliant account of its establishment in Westminster Review, Jan. 1831; author of able books on France and politics during succeeding years; as sec. to embassy at Constantinople obtained important commercial concessions from Turkey, 1838; app. ambassador to Spain, 1843; denounced dictatorship of Marshal Narvaez and was ordered to leave Spain; his act was approved at home and apology ultimately obtained; baron, 1871; one of the most skilled modern diplomatists.

BULWER - CLAYTON TREATY, a treaty made between the United States and Great Britain, in 1850, relating to rights governing the construction and operation of an interoceanic canal across Nicaragua. It was superseded in 1902 by the Hay-Pauncefote Treaty. The Bulwer-Clayton Treaty was negotiated by John M. Clayton, Secretary of State, representing the United States, and Sir Henry Lytton Bulwer, British minister at Washington, representing Great Brit. The latter had established a protectorate over the Mosquitia Coast in Nicaragua, and British interest thus created had become a factor in a project for cutting a canal across Nicaragua, which enterprise interested both nations. The treaty was intended to determine the views and intentions of Great Britain and the United States regarding the scheme, both declaring that they did not wish to seek or maintain control of such a ship canal and agreeing to co-operate in maintaining the canal when completed. The two countries also agreed to extend their protection to any other form of practicable communication, canal or railway, cut across the Panama Isthmus. As the treaty stood, it prevented either country from securing exclusive rights to any Nicaraguan canal. It was a highly unpopular convention. The Monroe Doctrine was an element in the American hostility to it, for it seemed to strengthen the

British position in Central America and to restrain the United States from interfering. Also, it gave Great Britain a voice in the building of any canal across Panama. By 1880 American sentiment for exclusive United States jurisdiction over any Central American canal became expressed in a message to Congress by President Hayes, who declared for an American Canal under American control. The following year James G. Blaine, Secretary of State, notified the European powers that the United States in future would allow no foreign interference in the control of any Isthmian Canal, whose neutrality the American Government itself would guarantee, and that any European action taken toward sharing such a guaranty would be viewed as tantamount to an alliance against the United States. The long-drawn issue was finally disposed of by John Hay, Secretary of State, and Sir Julian Pauncefote, British Ambassador, formulating the treaty that bears their name, and its ratification.

BUMPUS, HERMON CAREY (1862); an American college president; b. in Buckfield, Me. He graduated from Brown University, in 1884; was professor of comparative anatomy at Brown University, 1892-1901; then, first assistant, later director, of the Marine Biological Laboratory of the U.S. Fish Commission, at Woods Hole, Mass.; director of the American Museum of Natural History, 1902-11; business manager of the University of Wisconsin, 1911-14; and president of Tufts College, 1914-1919. He has written many articles on biological subjects, and *A Laboratory Course in Invertebrate Zoology*, 1893.

BUN, name given to a round light cake, about the size of a saucer, made of ordinary baker's dough mixed with currants, raisins, and candied peel. 'Scotch bun,' on the other hand, is much larger and thicker, and is a heavy, rich, spiced cake covered with a thin outer crust of ordinary dough.

BUNBURY (33° 15' S., 115° 35' E.); port, Western Australia.

BUNCOMBE, a county in North Carolina. From it is derived the term buncombe or bunkum, meaning bambastic speech making. It is said to have originated from a member of Congress from this county who declared that he was only talking for Buncombe, when efforts were made to curb his speech.

BUNDELKHAND, BANDALKHAND (25° N., 80° E.), district, Central India States; area, c. 13,000 sq. miles; surface

generally hilly; plain in N.E.; mountains are Bindhachal, Panna, and Bander ranges; rivers, Sind, Betwa, Ken, Jumna, etc. Diamonds are found. Fauna includes tigers, hyenas, leopards. British acquired all rights in B. from peshwa, 1817. Pop. 1,500,000.

BUNDI, BOONDEE (25° 26' N., 75° 37' E.), state, Rajputana, India; chief town, Bundi. Pop. 175,000.

BUNDY, OMAR (1861), an American soldier; b. in New Castle, Ind. He graduated from the U.S. Military Academy, in 1883, and from the U.S. Infantry and Cavalry School, in 1887. During 1890-1 he served against the Indians in the West, and saw active service in Cuba and the Philippines during the Spanish-American War. During the war against Germany he had command of the Second Div., of the American Expeditionary Forces, and, toward the close of the war, commanded the Seventh Army Corps, with the rank of major-general. Since 1922 he has been in command of the forces of the Department of the Philippines.

BUNGALOW, Anglo-Ind. word for one-storied house with wide verandah, the typical European residence in tropics; now used for similar house elsewhere. Dak bungalows are houses built by Indian Government for the use of travellers.

BUNION, swelling caused by chronic inflammation of synovial sac on metatarsal joint of great toe; due mainly to wearing of improperly made boots; treated by correcting the deformity of the great toe by proper boots, manipulation, etc., soothing applications to the swelling; in very pronounced cases operation is necessary.

BUNKER HILL (42° 24' N., 71° 3' W.), low hill, Charlestown, suburb of Boston; granite obelisk marks site of famous battle in American War of Independence (June 17, 1775), when Amer. forces were defeated. The hill on which the monument stands is really Breed's Hill. Bunker Hill is the neighboring eminence in which a part of the battle took place. See BREED'S HILL.

BUNNER, HENRY CUYLER (1855-1896), an American short story writer; b. in Oswego, N. Y. Beginning his career as a clerk in a large wholesale house, in New York City, he later took up journalism as a newspaper reporter, finally, in 1877, becoming editor of the famous humorous weekly, Puck, a position he held until his death. He was extremely popular during his time on account of his humorous short stories,

the best of which were published under the titles *Short Sizes*, 1891; and *More Short Sizes*, 1894. He also wrote two novels which enjoyed a temporary popularity, *The Midge*, 1886; and *The Story of a New York House*, 1887.

BUNSEN, CHRISTIAN CHARLES JOSIAS, BARON VON (1791-1860), Ger. diplomatist; b. Korbach; ed. Korbach Grammar School and Marburg Univ.; became sec. and subsequent successor to Niebuhr, Prussian envoy to papal court; aided Fred. William IV. to establish Prusso-Anglican bishopric at Jerusalem; was ambassador to court of St. James's for thirteen years; sat in Prussian Upper House as Baron von B. (1858), and henceforth engaged mainly in literary work.

BUNSEN, ROBERT WILHELM VON (1811-99), Ger. chemist; successively Chemistry prof. at Marburg, Breslau, and Heidelberg; famous as the founder, with Kirchhoff, of spectrum analysis; the inventor of the *burner* (in which gas is sent through a tube which is pierced at the base as well as open at the top; air is thus drawn in, and an intensely hot non-luminous flame is produced; the principle is utilized in laboratories and in gas stoves) and cell bearing his name, and magnesium light; famous for numerous other researches.

BUNYAN, JOHN (1623-88), Eng. religious leader and writer; b. near Bedford, of humble parentage. He spent a gay boyhood, but it was gradually borne in upon him that he was extraordinarily wicked, although he never seems to have lived an immoral life, swearing being his only vice. He married in 1648, gradually gave up his amusements and dancing, and led a religious life, but could find no inward peace. At length he became happier, and preached the Gospel. But nonconformist preaching was not tolerated, and in 1660 he was imprisoned in Bedford gaol. In prison he wrote his *Grace Abounding to the Chief of Sinners*, describing his own religious conflict. He was let out for a short time in 1662, and again imprisoned till 1678. In 1678 appeared his *Pilgrim's Progress*, one of the most famous religious books in English. Before his death it was read widely by England, New England, and among foreign Protestants. Written in the form of an allegory, it had appealed to successive generations of readers, although, as a modern authority points out, it was for long read almost only by the lower orders of society. His position among Baptists was such that he was called 'Bp. Bunyan,' and though he sometimes feared persecution he was

never again imprisoned. He published *The Life and Death of Mr. Badman* in 1680, and in all more than fifty other works.

BUONAPARTE. See **BONAPARTE.**

BUONARROTI. See **MICHELANGELO.**

BUOY, an anchored floating body used as a guide to navigation or for the purpose of mooring ships. Mooring-buoys are made of wood or iron, and are used in places where anchorage is impossible or inconvenient. The more important use of B's., however, is to mark the limits of a navigating channel, or to indicate the existence of dangerous obstructions, as rocks, shoals, sunken wrecks, etc.

BURAUEN (10° 58' N., 124° 55' E.), town, Leyte, Philippine Islands; hemp. Pop. 20,000.

BURBAGE, JAMES (d. 1597), Eng. actor and manager; built the Shoreditch Theater (1576), the earliest in London; afterwards built the Blackfriars Theater (1596).

BURBAGE, RICHARD (d. 1619), s. of the above, was the most famous actor of his day, excelling especially in Richard III. and other tragic parts. He pulled down the Shoreditch Theater and erected the Globe, in the proprietorship of which he was associated with Shakespeare and others. (Quiller-Couch, *Shakespeare's Christmas*.) He was also an artist, and the 'Felton' Shakespeare portrait is said to have come from his brush.

BURBANK, LUTHER (1849), an American horticulturist, etc.; b. in Lancaster, Mass. The son of a hard-working farmer, he was largely self-taught, but managed to obtain some academic training at the Lancaster Academy. In 1875 he went out to California, where he established a nursery business in Santa Rosa. Here, by a process of natural selection, by means of experiments of tremendous scope, he created new varieties of berries, fruits, vegetables and even timber trees. Among the most known of these are the Burbank potato, the 'Plumcot,' the pineapple-quince, a spineless cactus, the 'Burbank plum,' of tremendous size, etc. Among flowers his creations have been even more remarkable, including daisies almost a foot in diameter, an amaryllis of equal size, etc. By crossing he has also produced a walnut tree which grows into timber size in sixteen years. The cause of his success is the tremendous scale on which he carries on his experiments, his selections being made from hundreds of thousands of individual

plants. His methods and their results are explained in detail in a work of 12 volumes, *Luther Burbank; His Methods and Discoveries*. He has also written *How Plants are Trained to Work for Man*, 1921.

BURCH, CHARLES SUMNER (1855-1920), an American bishop; b. in Pinckney, Mich. Graduating from the University of Michigan, in 1875 he went into the publishing business, in Chicago, later becoming managing-editor of the Grand Rapids (Mich.) Press. In 1905 he was ordained a priest of the Protestant-Episcopal Church and became rector of St. Andrew's Church, on Staten Island, N. Y. In 1911 he became suffragan bishop of New York, and in 1919, Bishop.

BURCHARD, SAMUEL D. (1891-1912), an American Presbyterian clergyman; b. in Steuben, N. Y. He graduated from Center College, in 1836, and was for a while pastor of the Houston St. Presbyterian Church, in New York City, being known as an energetic speaker against slavery and advocate of prohibition. His fame, however, rests entirely on an incident which occurred in New York City during the Presidential campaign in 1884. As a member of a delegation representing some 600 clergymen of the city and state, which interviewed James G. Blaine, the Republican candidate, Dr. Burchard made a speech in which he declared that the Democratic Party stood for 'Rum, Romanism and Rebellion.' Blaine neglecting to disclaim this sentiment as his own, the Democrats at once made use of the reference as an indication of Blaine's attitude toward the Catholic Church. It was generally believed that the effect was strong enough to swing a considerable number of Catholic voters away from him, thus bringing about his defeat and the election of Grover Cleveland.

BURCKHARDT, JACOB (1818-97), Swiss author; his writings are on art subjects, and include *Der Cicerone; eine Anleitung zum Genuss der Kunstwerke Italiens*, 1885; *Die Cultur der Renaissance in Italien*, 1860. Eng. trans. of which have been published.

BURDETT-COUTTS, WILLIAM LEHMAN ASHMEAD BARTLETT (1851), M.P. for Westminster since 1885; American by birth; married, 1881, Baroness Burdett-Coutts and assumed her name; interested in social and philanthropic work; was an originator of the Fisheries Exhibition; strong advocate since 1902 of railway reform.

BURDETTE, ROBERT JONES (1844-

1914), an American humorist; *b.* in Greensboro, Pa. He served in the Union armies during the Civil War as a private, after which he took up journalism, in Peoria, Ill. In 1872 he became assistant editor of the Burlington (Ia.) Hawkeye, and here acquired a national reputation on account of his humorous writings. Later he joined the staff of the Brooklyn Eagle, also lecturing throughout the country. In 1887 he entered the Baptist ministry, becoming pastor of the Temple Baptist Church, in Los Angeles, Cal. Later he served a term as city commissioner of Pasadena. Among the many collections of his writings are *Hawkeyetms*, 1877; *Smiles Yoked with Sighs*, (verse) 1900; *Old Times and Young Tom*, 1912; and *Drums of the Forty-seventh*, 1914.

BURDICK, FRANCIS MARION (1845-1920), an American jurist. After graduating from Hamilton College, in 1869, he was editor of the Utica (N. Y.) Herald; he practiced law in Utica, 1872-83; was professor of law at Hamilton College, 1882-7; professor of law at Cornell University, 1887-91; then Dwight professor of law at Columbia University, 1891-1916. He was considered a national authority on certain phases of law. Among his writings are *The Essentials of Business Law*, 1902; and *Law of Partnership* (3rd ed.), 1917.

BURDOCK, or *Arctium Lappa*, is a common American species of Compositae which is often found growing by roadsides. It occurs also in Asia and on the Continent, and is the single species of its genus. The leaves of the involucre are hooked and spinous when the fruit is ripe, and assist in its dispersal. See *Bux*.

BURDWAN, BARDWAN (23° 14' N., 87° 54' E.), town, Bengal, Brit. India; composed of numbers of small villages; palace and gardens of Maharajah; group of 108 temples.

District is flat, well-watered plain; important coal-fields; indigo, silk; area, 2,689 sq. miles.

Division, bordering Bay of Bengal, comprises six districts; area, 13,949 sq. miles. Pop., town, 35,000; district, 1,532,500; division, 8,240,000.

BUREAUCRACY, system of government in which various departments are controlled by officials independent of the electorate.

BUREAU OF THE BUDGET. See *BUDGET SYSTEM, UNITED STATES.*

BURG (52° 16' N., 11° 51' E.), town, Prussian Saxony, Germany; cloth, leather. Pop. 23,500.

BURGAS (42° 30' N., 27° 30' E.), seaport, Eastern Rumelia, on inlet of Black Sea; grain, wool. Pop. 15,000.

BURGER, GOTTFRIED AUGUST (1748-94), Ger. poet; famous as the author of the ballad *Lenore*, which first appeared in the Göttingen Musenalmanach, in 1773. This essay in the supernatural was very widely read, and was trans. into Eng. by Sir Walter Scott. None of B.'s other writings achieved very great popularity, and his ill-regulated life ended in failure and pecuniary want.

BURGESS, CHARLES FREDERICK (1873), an American electro-chemist. He graduated from the University of Wisconsin, in 1895, and since 1900 has been professor of applied electro-chemistry and chemical engineering at the University of Wisconsin. His works are considered highly authoritative, among them being *The Strength of the Alloys of Nickel and Copper with Electrolytic Iron*, 1910.

BURGESS, EDWARD (1848-1891),¹ an American yacht designer; *b.* in West Sandwich, Mass. He graduated from Harvard University, in 1871, then became secretary of the Boston Society of Natural History. In 1879 he became instructor of entomology at Harvard University. Meanwhile he became interested in naval architecture, and designed three cup-winning yachts; the Puritan, which won the America Cup in 1885; the Mayflower, winner in 1886; and the Volunteer, winner in 1887.

BURGESS, FRANK GOELET (1866-) an American author and illustrator. Graduating from the Massachusetts Institute of Technology, in 1887, he became draughtsman for the Northern Pacific R. R., then, in 1891, taught drawing at the University of California, in Berkeley, Cal. In 1891 he was assistant editor of *The Wave*, a San Francisco publication. His specialty, for which he became famous, was nonsense rhymes, with his own illustrations some of the best of which are those which have been collected under the titles *Goops and How to Know Them*, 1900; and *The Goop Encyclopedia*, 1915. Among his other works are *The White Cat*, 1907; *The Master of Mysteries*, 1912; and *Mrs. Hope's Husband*, 1917. He has also edited *My Maiden Effort*, 1921.

BURGESS, FREDERICK (1853), an American bishop; *b.* in Providence, R. I. He graduated from Brown University, in 1873, studied at the General Theological Seminary in 1874-5, and at Oxford University, England, in 1876.

In 1877 he was ordained a priest of the Protestant-Episcopal Church, being then rector successively at Mendham, N. J., Amherst, Mass., Pomfret, Conn., Bala, Pa., Detroit, Mich., and of Grace Church Brooklyn, N. Y. In 1902 he was consecrated Bishop of Long Island, N. Y.

BURGESS, JOHN WILLIAM (1844), an American college professor; b. in Giles County, Tenn., Aug. 26, 1844. He served two years in the Union armies as a private during the Civil War, then graduated from Amherst College, in 1867, practiced law for a short time, becoming professor of history and political science at Amherst College, in 1873. Since 1876 he has been professor of political science at Columbia University, and dean of that department since 1890. In 1906-7 he was Roosevelt exchange professor of American history at the University of Berlin, Germany. Among his works are *America's Relations to the Great War*, 1916; *The Russian Revolution and the Soviet Constitution*, 1919; and *The Transformation of the Constitutional Law of the United States between 1898 and 1920*, 1921.

BURGH, BURKE, Irish family prominent in history; founded, 1189, by William, bro. of Hubert de Burgh. His s. Richard conquered nearly all Ireland, and was cr. Earl of Ulster. This earldom came to crown by marriage of heiress to Lionel, s. of Edward III., but most of de Burgh lands were divided between two male kinsmen from whom descended earl and marquesses of Clanricarde and viscounts and earls of Mayo.

BURGH, HUBERT DE (d. 1243), Eng. chief justiciar (1215-31); held important offices under John, and received custody of Arthur of Brittany, whom he is said to have preserved from being blinded (1201); repulsed Fr. invasion, 1217; ruled kingdom in minority of Henry III., dismissing foreign mercenaries. B. was a great popular minister.

BURGHLEY or **BURLEIGH WILLIAM CECIL, BARON, BURLEIGH** (1520-98), Eng. statesman; M.P. for Stamford (1547); fought at Pinkie Cleugh; master of requests and sec. of Protector Somerset (1548); Chancellor of the Garter (1552); not prominent under Mary, but made Chief Sec. of State on accession of Elizabeth, who said to him: 'This judgment I have of you, that you will not be corrupted with any manner of gifts, and that you will be faithful to the state'—a speech regarded as outlining Cecil's character; from this time his policy was the Queen's; master of court of wards

(1561); lord high treasurer (1572); claim to fame is that of successful administrator; his spy-system being the only blot on his administration; a scholar, pattern of domestic virtue, and a friend to poor. He was of medium height, small build, with a large nose, fine eyes, and beard.

BURGLARY, SEE THEFT.

BURGOMASTER (Ger. *burger-meister*, master of the borough), head of corporation of a Ger. or Dutch town.

BURGOS (42° 25' N., 3° 40' W.).—(1) province, Northern Spain, S. of Biscay and Alava; elevated surface, traversed N. and N.E. by series of mountain chains; unfertile soil; thinly populated; sheep-farming. Area, 5,480 sq. miles. Pop. 1919, 350,000. (2) Cap. of B. province; fine Gothic cathedral; manufactures woollens, linens, hats; surrendered to British, 1813. Pop. 35,000.

BURGOYNE, JOHN (1722-92), Brit. general, politician, and playwright; caused general outcry by surrendering to Amer. forces at Saratoga, 1777.

BURGOYNE, SIR JOHN FOX (1782-1871), Brit. general; illegitimate s. of above; distinguished in Peninsular and Crimean Wars.

BURGUNDIANS. See FRANCE (HISTORY.)

BURGUNDY, BOURGOGNE (c. 47° 20' N., 5° E.), ancient province, France; named after Burgundil, who founded kingdom in S.E. Gaul in V. cent.; overcome by Franks, 534. On break-up of Charlemagne's empire, two kingdoms of B. were established; these were united as kingdom of Arles in 933; annexed to Ger. empire, 1932. Duchy was founded in 887; on death of Duke Philip in 1361 it was attached to Fr. crown. King John granted it to s., Philip, 1363; engaged in struggle for supremacy with France and England. On death of Charles the Bold (q.v.) it reverted to Fr. crown, 1477. Soil is fertile, famous wines and agricultural products; chief town, Dijon.

BURIAL.—Like modern nations of Europe, many primitive and Oriental peoples have practiced *inhumation* (the b. of corpses in the earth), and with it many interesting customs are associated: the Australian aborigines take off the nails of the corpse and tie its hands so that it may not be able to work its way out again; with the Norse warrior were buried his horse and armor, ready for his ride to Valhalla; the Laplander places beside the corpse steel, flint, and tinder for the dark journey, and nearly

every primitive people gives evidence of thoughtfulness for the needs of the next life; the classic instance is the coin placed by the Greeks on the tongue of the deceased to pay Charon for ferrying him over the Styx, and the honey-cake provided for Cerberus. The Parsees are almost alone in exposing the corpse.

Cremation (Lat. *crematio*, burning by fire), burning of dead human bodies to ashes was practiced by the later Greeks, Romans, Danes, etc., evidence being found in barrows of all countries of Europe. Christian inhumation was universal, probably owing to doctrine of resurrection of body, but Cremation Societies were formed in XIX. cent., and c. is urged on sanitary grounds. Burial Acts (see below) have made reforms in system of inhumation, but c. remains preferable from health standpoint; sole object of c., as described by pioneer, Sir Henry Thompson, is to resolve dead body into its final constituents of carbonic acid, water, and ammonia 'rapidly, safely, and not unpleasantly.' Apparatus invented by Prof. Brunetti, was exhibited at Vienna Exhibition, 1873, for completely consuming body in 6 hours. The first Ger. crematorium was established at Gotha (1878). An Eng. Cremation Society was established, 1874, under presidency of Sir Henry Thompson; one acre of land at Woking purchased, 1878, and Prof. Gorini of Lodi invited to build furnace.

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BURGESS, JOHN WILLIAM (1844), an American college professor; b. in Giles County, Tenn., Aug. 26, 1844. He served two years in the Union armies as a private during the Civil War, then graduated from Amherst College, in 1867, practiced law for a short time, becoming professor of history and political science at Amherst College, in 1873. Since 1876 he has been professor of political science at Columbia University, and dean of that department since 1890. In 1906-7 he was Roosevelt exchange professor of American history at the University of Berlin, Germany. Among his works are *America's Relations to the Great War*, 1916; *The Russian Revolution and the Soviet Constitution*, 1919; and *The Transformation of the Constitutional Law of the United States between 1898 and 1920*, 1921.

BURGH, BURKE, Irish family prominent in history; founded, 1189, by William, bro. of Hubert de Burgh. His s. Richard conquered nearly all Ireland, and was cr. Earl of Ulster. This earldom came to crown by marriage of heiress to Lionel, s. of Edward III., but most of de Burgh lands were divided between two male kinsmen from whom descended earl and marquesses of Clanricarde and viscounts and earls of Mayo.

BURGH, HUBERT DE (d. 1243), Eng. chief justiciar (1215-31); held important offices under John, and received custody of Arthur of Brittany, whom he is said to have preserved from being blinded (1201); repulsed Fr. invasion, 1217; ruled kingdom in minority of Henry III., dismissing foreign mercenaries. B. was a great popular minister.

BURGHLEY or BURLEIGH WILLIAM CECIL, BARON, BURLEIGH (1520-98), Eng. statesman; M.P. for Stamford (1547); fought at Pinkie Cleugh; master of requests and sec. of Protector Somerset (1548); Chancellor of the Garter (1552); not prominent under Mary, but made Chief Sec. of State on accession of Elizabeth, who said to him: "This judgment I have of you, that you will not be corrupted with any manner of gifts, and that you will be faithful to the state"—a speech regarded as outlining Cecil's character; from this time his policy was the Queen's; master of court of wards

(1561); lord high treasurer (1572); claim to fame is that of successful administrator; his spy-system being the only blot on his administration; a scholar, pattern of domestic virtue, and a friend to poor. He was of medium height, small build, with a large nose, fine eyes, and beard.

BURGLARY, SEE THEFT.

BURGOMASTER (Ger. *burgermeister*, master of the borough), head of corporation of a Ger. or Dutch town.

BURGOS (42° 25' N., 3° 40' W.).—(1) province, Northern Spain, S. of Biscay and Alava; elevated surface, traversed N. and N.E. by series of mountain chains; unfertile soil; thinly populated; sheep-farming. Area, 5,480 sq. miles. Pop. 1919, 350,000. (2) Cap. of B. province; fine Gothic cathedral; manufactures woollens, linens, hats; surrendered to British, 1813. Pop. 35,000.

BURGOYNE, JOHN (1722-92), Brit. general, politician, and playwright; caused general outcry by surrendering to Amer. forces at Saratoga, 1777.

BURGOYNE, SIR JOHN FOX (1782-1871), Brit. general; illegitimate s. of above; distinguished in Peninsular and Crimean Wars.

BURGUNDIANS. See FRANCE (HISTORY.)

BURGUNDY, BOURGOGNE (c. 47° 20' N., 5° E.), ancient province, France; named after Burgundii, who founded kingdom in S.E. Gaul in V. cent.; overcome by Franks, 534. On break-up of Charlemagne's empire, two kingdoms of B. were established; these were united as kingdom of Arles in 933; annexed to Ger. empire, 1932. Duchy was founded in 887; on death of Duke Philip in 1361 it was attached to Fr. crown. King John granted it to s., Philip, 1363; engaged in struggle for supremacy with France and England. On death of Charles the Bold (q.v.) it reverted to Fr. crown, 1477. Soil is fertile, famous wines and agricultural products; chief town, Dijon.

BURIAL.—Like modern nations of Europe, many primitive and Oriental peoples have practiced *inhumation* (the b. of corpses in the earth), and with it many interesting customs are associated: the Australian aborigines take off the nails of the corpse and tie its hands so that it may not be able to work its way out again; with the Norse warrior were buried his horse and armor, ready for his ride to Valhalla; the Laplander places beside the corpse steel, flint, and tinder for the dark journey, and nearly

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ham ministry (1782) B. became Paymaster of the Forces, and was entrusted with the great plan of economical reform. He had lost his Bristol seat (1780) as a result of his advocacy of Irish claims to similar indulgence as America. During rest of his parliamentary life he sat for Malton, a pocket borough. On Rockingham's death (July 1782), B. and Fox declined to serve under Shelburne, and joined North in coalition against him. The coalition forced on king a government nominally headed by Duke of Portland (1783). B. returned to his office of paymaster. Rejection of India Bill resulted in dismissal of ministers (Dec. 1783), and Pitt accepted the premiership. B. was soon engaged in his famous impeachment of Warren Hastings whose trial began (Feb. 1788), but was more famous for oratory than for its results, and finally ended in Hastings acquittal (1795).

BURKE, KATHLEEN (1887), an English Red Cross worker, b. in London, England. After a course of study at the University of Paris, she became secretary of the Scottish Women's Hospitals, but on the outbreak of the World War began raising funds for the Red Cross. She was the first woman allowed to speak before the members of the New York Stock Exchange as a body. By one speech she raised \$390,000 for the Red Cross. She was the first woman allowed to enter the area of hostilities at Verdun and also the first woman allowed to visit the British front in France. In the United States she became widely popular through her public speaking during the war period and was granted the 'freedom' of the cities of San Francisco, Cal., Fresno, Cal., and Flint, Mich., being also made honorary colonel of the 138th Field Artillery, of the U.S.A. She is the author of *'The White Road to Verdun.'*

BURKE, ROBERT O'HARA (1820-61), Australian traveler; b. Ireland; ed. Belgium; became a captain in Austrian army; member of Royal Irish Constabulary, 1848; emigrated, 1853, and became a police-inspector at Melbourne; led heroic, ill-fated expedition across Australian continent, 1860-61; died of starvation on return journey.

BURLESON, ALBERT SIDNEY (1863), an American public official; b. in San Marcos, Tex. Graduating from the University of Texas, in 1884, he practiced law, was assistant city attorney, during 1885-90, and was elected to the 56th-62nd Congresses, was re-elected to the 63rd Congress, but resigned to become Postmaster-General in President Wilson's Cabinet, serving

as such from 1913 until 1921.

BURLESQUE (Ital. *burlesco*), literary treatment of a serious theme in a comic way; favorite *genus* in every age, representing constant human dislike of tension of emotion. The Homeric epic was burlesqued in the *Batrachomachia* (Battle of the Frogs and Mice), and there was much mediæval B. of so-called *Passiones*. Mediæval Fr. *soxies* were blend of satire and B.; great feature of the Renaissance, which produced the *Orlando Innamorato* of Berni, *Don Quixote*, and *The Knight of the Burning Pestle*. The B. is distinguished from the modern farce by its seriousness of treatment and different quality of the amusement raised.

BURLINGAME, ANSON (1820-70), Amer. diplomatist; minister to China, and associated with 'Burlingame Treaty.'

BURLINGTON, a city of Iowa, the county seat of Des Moines co. It is on the Chicago, Burlington and Quincy; the Chicago, Rock Island and Pacific, and other railroads. It is important industrially and has manufactures of crackers, pearl buttons, agricultural implements, boilers, engines, etc. Here are located the machine and repair shops of the Chicago, Burlington and Quincy Railroad system. Its public buildings include a court house, an opera house, hospitals, a library and a park. Pop. 1920, 24,057.

BURLINGTON, a city of New Jersey, in Burlington co. It is a port of entry and is on the Pennsylvania Railroad and on the Delaware River, 18 miles north-east of Philadelphia. It is notable for its advantages as a residential city. It has several important churches and educational institutions. Its industries include the manufacture of shoes, iron pipes, terra cotta, and canned goods. Burlington was settled in 1677 by Friends and for many years was the seat of the government of West Jersey. It was the residence of William Franklin, the last Colonial Governor of New Jersey. It was incorporated as a city in 1784. Pop. 1920, 9,049.

BURLINGTON, a city of Vermont, in Chittenden co., of which it is the county seat. It is on the Central Vermont and Rutland railroads and on Lake Champlain and the New York Barge Canal. It has an important lake commerce and its industries include the manufacture of lumber, cotton, and woollen goods. It is the center of an important agricultural community. The city is notable as being the seat of many important educational institutions, including the State University of Vermont and the

State Agricultural and Medical Colleges. It has also several fine churches, including a Roman Catholic cathedral. There are also many philanthropic institutions, some state and others private. The city was settled in 1773 and during the War of 1812 was a garrison post. It was incorporated in 1865. Colonel Ethan Allen is buried in Greenmount Cemetery, beneath a handsome monument. Pop. 1920, 22,779.

BURMA, large prov. in S. E. of Ind. Empire (10°-27° 20' N., 92° 11'-110° 9' E.), 1,100 m. in extreme length, 700 in breadth; bounded N. by China, E. by China, Fr. Indo-China, and Siam, S. by Bay of Bengal, W. by Bay of Bengal, Bengal, Manipur, Assam; includes Upper and Lower Burma. Latter comprises Arakan, Pegu, and Tenasserim, all belonging to Britain; former has belonged to Britain since 1885, previous to which it was the kingdom of Burma.

Surface is mountainous, with vast forests of teak and bamboo; river plains or deltas at river mouths are only flat parts, and are flooded in wet season; principal mountains are the Patkoi Hills in N., the Kachin, Shan, and Karen Hills in E., Pegu Yoma and Arakan Yoma; chief rivers, Irawadi, Sittang, Salwin; climate trying; huge rainfall up country; chief towns, Rangoon (cap.), Mandalay (native cap.).

Rice is largely cultivated in both Upper and Lower Burma, and is chief export. Teak, oil-tree, ironwood, and palms are among valuable trees, and many fruits are grown, including bananas, pineapples, guaves. Tobacco, sugar-cane, tea, cotton, are cultivated; many varieties of precious stones found; rich ruby mines in upper district beyond Mandalay; sapphires and other gems, jade, etc. Minerals include gold, silver, copper, tin, iron, wolfram, petroleum. All these are exported, also rice, teak, bamboo, cotton, hides, wax, ivory, gum, rubber, oil. People display skill in silver repoussé work, wood carving, lacquer work, silk weaving; imports, European manufactured goods. Rivers are chief means of communication; Irawadi navigable all year. Roads and railways have developed greatly under Brit. administration. Area, 230,839 sq. m.; pop. 12,115,200.

Inhabitants include Burmese, who form great majority of population, Karens, Talalings, Chins, Shans, and other races. Burmese proper are of Mongoloid stock, are brown-skinned, black-haired, and robust in figure. About 90 per cent. are Buddhists, other religions including Hinduism, Christianity, and Islamism. The language is

akin to Shan and Tibetan tongues. Ancient or Pali literature consists chiefly of Buddhist scriptural writings. Burmese modern literature includes plays, rhymed fables and religious works. See MAP CENTRAL AND S. ASIA.

Administration is carried out by lieut.-gov., assisted by a legislative council of 17 members; lieut.-gov. is nominated by gov.-gen.; prov. is subdivided into 8 divs., each administered by a commissioner. Northern and Southern Shan States are administered through Sawbwas or hereditary chiefs.

History.—Early history rests on tradition. Upper Burma was powerful kingdom in 11th-13th cent. A. D.; and in 14th-15th cent. the two chief powers were those of Ava in N. and Pegu in S. Pegu was one of several old kingdoms in Lower Burma; it held the supreme power in 16th cent. when the Irawadi and Sittang valleys were included in its dominions. It came to an end in middle of 18th cent., when new Burmese Empire was established by Alompra. First Burmese War caused by Burmese encroachments on Brit. possessions; Brit. Government declared war, 1824; ended by Treaty of Yandalor, 1826, which granted Brit. terms. Second Burmese War, 1852, provoked by bad treatment of Brit. merchants at Rangoon; resulted in annexation of Pegu. Third Burmese War, 1885-6, caused by attempt on part of Burmese Government to hinder trade between Bombay and Burma; Brit. army crossed frontier; Nov. 14, 1885, occupied Mandalay, Nov. 28, and sent Burmese king, Thebaw, to Rangoon. Upper Burma was formally annexed, Jan. 1, 1886.

BURNAND, SIR FRANCIS COWLEY (1836-1919), Eng. humorist; editor of *Punch*, 1880-1906; knighted, 1902; author of *Happy Thoughts*, and, in his earlier years, of innumerable burlesques and farces.

BURNE-JONES, SIR EDWARD, Bart. (1833-98), Eng. artist; b. Birmingham; ed. Oxford, where he formed a friendship with William Morris, and became deeply impressed with paintings of D. G. Rossetti, under whom he afterwards studied. Being a fine classical scholar, and an enthusiastic student of Chaucer and the earlier Eng. writers, his mind was richly stored with mythological and mediæval lore, which he turned to useful account in his choice of subjects for pictures, decorative work, and stained-glass designs, of which latter he produced an immense number.

BURNELL, ARTHUR COKE (1840-82), Eng. Sanskrit scholar; employed in Indian Civil Service at Madras; pub. a

Handbook of South Indian Palaeography, and similar works.

BURNES, SIR ALEXANDER (1805-41), Scot. traveler; entered the service of the East India Company as a youth; later made extensive journeys through Afghanistan to Bokhara and Persia, accounts of which he pub., 1834; assassinated at Kabul during an insurrection.

BURNET, GILBERT (1643-1715), Anglican bp. and historian; b. Edinburgh; a. of a lawyer who became judge of the Court of Session; ed. Marischal Coll., Aberdeen; took orders in the Episcopal Church; prof. of Divinity at Glasgow, 1669. Received preferments from Charles II., but, venturing to reprove the king upon one occasion, he lost Court favor; settled in Holland and became attached to interests of William of Orange, on whose accession he was made bp. of Salisbury, which office he filled with conspicuous ability; mainly responsible for establishment of Queen Anne's Bounty. He was the author of a *History of the Reformation of the Church of England, 1679-1714*, but is chiefly remembered by his valuable *History of My Own Times*, 1723, pub. by his own desire after his death.

BURNETT, FRANCES ELIZABETH HODGSON (1849), English-Amer. novelist; she has written many novels, some of them tales of her native Lancashire, others dealing with Amer. scenes and characters. She achieved her greatest success in *Little Lord Fauntleroy*, a fairy tale of real life. Among her best known works are *That Lass o' Lowrie's*, *Little Saint Elizabeth*, *A Lady of Quality*, *The Pretty Sister of Jose*, *The First Gentleman of Europe*, etc.

BURNEY, CHARLES (1726-1814), Eng. musician; studied under Dr. Blow and Dr. Arne; won considerable fame as an organist. Besides operatic pieces, he wrote numerous sonatas, concertos, and anthems. He is chiefly remembered for his exhaustive *History of Music*, 1776-89, and for the descriptions of his musical tours. His life was written by his dau., Fanny, Madame D'Arbly (q.v.).

BURNEY, FANNY, Madame D'Arbly (1752-1840), Eng. novelist; famous as author of *Evelina*, 1778; *Cecilia*, 1782; helped to develop Eng. novel as form of lit.; entered service of Queen Charlotte; her *Diary* was begun in 1768.

BURNHAM, CLARA LOUISE, an American author; b. in Newton, Mass. As a child she went to Chicago, where she began her first literary work, of a popular character. Among her many

books are *The Opened Shutters*, 1906; *In Apple Blossom Time*, 1919; and *The Keynote*, 1921.

BURNHAM, EDWARD LEVY LAWSON, LORD (1833-1916), chief proprietor of Daily Telegraph.

BURNHAM, WILLIAM POWER (1860), an American soldier; b. in Scranton, Pa. He studied at West Point, but not graduating, enlisted in the ranks, working his way up to a commission. During the Spanish-American War he was a lieutenant-colonel of volunteers. During the war against Germany he had command of the 82nd Div. at the front, in France. In 1919 he was honorably discharged as a major-general, and resumed his rank as a colonel of infantry in the regular army. He has written *Three Roads to a Commission in the United States Army*, 1892; and *Duties of Outposts, Advance Guards, Etc.*, 1893.

BURNING ALIVE was a common death penalty, for both sexes, from very early times. In England, at one time, it was frequently in use for heresy and alleged witchcraft. The punishment was abolished by statute in 1790.

BURNLEY (53° 48' N., 2° 15' W.), town, Lancashire, England; cotton-weaving; near collieries. Pop. 103,175.

BURNOUS, BURNOOSE, hooded cloak, generally of wool; worn by Arabs.

BURNS, JOHN (1858), Brit. politician; b. London; worked as an engineer; imprisoned, 1887, for asserting right to hold mass meetings in Trafalgar Square; a leader of the great dock strike, 1889; elected to London County Council, 1889; M.P. for Battersea since 1892; Pres. of Local Government Board, with seat in Cabinet, in ministries of Sir H. Campbell-Bannerman, 1905, and Mr. Asquith, 1908. The extreme Labor views which he at first held have gradually approximated to those of the orthodox member of the Liberal party. In office, without having inaugurated any great measures of reform, he has set an example of efficient administration. He resigned office in 1914 at the outbreak of the World War.

BURNS, ROBERT (1759-96), Scot. poet; s. of William Burness, a small farmer who lived in a clay cottage built with his own hands at Alloway, near Ayr. Robert, first of seven children, was b. Jan. 25; he went to school at the age of six, and was afterwards taught by a village tutor, named Murdoch. His f. was always a poor man, and unsuccessful in all his ventures, but he was of studious habits, and this trait seems to have been transmitted to his son, for

during his early youth the poet steeped his mind in the Eng. classics, and so laid the foundation of that virile prose style which afterwards became remarkable. He also mastered the first six books of Euclid, and even dabbled in Latin. Meantime the *f.* had removed to Mount Oliphant, a larger farm, and here Robert, at the age of fifteen, became his *f.'s* assistant, and led for the following ten years a life of hard toil. The elder B. died when Robert was twenty-five years of age, and for some years afterwards he, and his *bro.* Gilbert, stuck to farming at Lochlea, and at Mossiel, but misfortune attended their efforts.

B.'s first volume of poems was pub. at Kilmarnock in 1786. This brought him the admiration of Edinburgh society, and a profit of £20. Scott, minutely describes B., particularly mentioning his poetic and glowing eye, his simplicity and dignity. It may be noted that, like Shakespeare, B. borrowed from every writer he had ever read—matter, phrase, and metre. To Robert Fergusson, in particular, he owed a large debt, which he honorably acknowledged by placing a memorial-stone over the grave of the young poet in Edinburgh.

BURNSIDE, AMBROSE EVERETT (1824-81), Amer. soldier, invented a breech-loading rifle (1856); commander of Army of the Potomac (1862); Gov. of Rhode Island (1866-69); Republican member of U.S. Congress (1875-81).

BURE, AARON (1756-1830), an American politician and soldier. He was b. in Newark, N. J., Feb. 5, 1756. His *f.* was president of Princeton College, and his *s.* entered that institution at the age of 12. After studying law for several years, at the outbreak of the American Revolution he joined the American army and he accompanied General Arnold as a volunteer in the latter's expedition toward Quebec, and during the terrible ordeal of the journey of this force through the wilderness, he acquitted himself with great courage. On his arrival at Quebec, he was appointed aide to General Montgomery. In 1776 he became a member of the military family of General Washington, but was soon dismissed on account of his dissipated habits, and for this he never forgave Washington. He attained to the rank of lieutenant-colonel. On his retirement from military life, in 1779, he began the practice of law in Albany, N. Y., and soon removed to New York City, where within a short time he occupied the foremost position as a lawyer. He frequently came into contact and competition in law cases with Alexander Hamilton. In 1789 he was

appointed Attorney General of New York, and from 1791 to 1798 was a member of the United States Senate where he was one of the leaders of the Republican Party. He was a candidate for the Presidency in 1800 and received 79 votes, the same number as was received by Thomas Jefferson. The choice was left to the decision of Congress which, after 36 ballots, elected Jefferson as President and Burr as Vice-President. In 1804, as a result of recriminations carried on both in public and private, he challenged Alexander Hamilton to a duel in which Hamilton was killed. This lost Burr public favor and he fled. He was arrested in 1807 and taken to Richmond, Va., where he was tried on a charge of treasonable designs upon Mexico. He was acquitted after a long trial. His public life, however, was over as he utterly lost the faith of the public. He resumed the practice of law but lived in obscurity until his death on Staten Island, September 14, 1836.

BURRA (33° 42' S., 138° 50' E.), town, S. Australia; site of Burra Burra copper mine, now disused.

BURRARD INLET (49° 18' N., 123° 26' W.), harbor; S.W. British Columbia.

BURRILLVILLE, a city of Rhode Island, in Providence co. It is on the New York, New Haven and Hartford Railroad. Its principal industry is the manufacture of woollen goods. In the neighborhood is Wallum Lake, a favorite summer resort. Pop. 1920, 8,606.

BURRITT, ELIHU (1810-79), Amer. humanitarian; a blacksmith who made himself master of a great number of languages; lectured throughout America and Europe on peace and universal brotherhood.

BURRO, small donkey, used as pack-animal.

BURROUGHS, BRYSON (1869), an American artist; b. in Hyde Park, Mass. As a student of the Art Student's League, in New York City, he won the Chanler Scholarship, for 1891, and continued his studies in Paris and Florence. Later he became curator of paintings of the Metropolitan Museum of Art.

BURROUGHS, GEORGE (d. 1892); preacher; held charges at Salem, Falmouth, and Wells. In 1892 he was charged with witchcraft by members of his congregation, condemned, and executed at Salem.

BURROUGHS, JOHN (1837-1921); an American naturalist and man of letters; b. in Roxbury, N. Y., April 3, 1837; d. Kingsville, Ohio, March 29,

BURSCHENSCHAFT

1921. For about eight years he taught school, then, in 1864, became a clerk in the U.S. Treasury Department, in Washington, D. C., and later, in 1873, a national bank examiner. In 1874 he acquired a farm at Riverby, West Park, on the Hudson, where he later settled down to raise fruit. His first literary work was a poem, *Waiting*, published in 1862, which immediately gained him recognition among lovers of good literature, but the book that made him widely known was *Walt Whitman; Poet and Person*, which appeared in 1867 and made Whitman famous as well. In later years, however, he was more generally known as a writer of nature studies, which subjects he could present not only as a first-hand authority, but with such pleasing style that his books were read by people not otherwise interested in nature. This intimate knowledge of nature was gained, not only in his own country home, but during many extensive ramblings in other parts of the country; in Alaska, in 1899, with E. H. Harriman, in the Yellowstone region, with Theodore Roosevelt, in 1903, and often alone. Among his works are *Signs and Seasons*, 1886; *The Light of Day*, 1900; *A Life of Audubon*, 1902; *The Ways of Nature*, 1905; *Under the Apple Trees*, 1916; and *Field and Study*, 1919.

BURSCHENSCHAFT, an association of Ger. students which was formed early in the XIX cent. to promote morality and patriotism.

BURSLEM (53° 3' N., 2° 12' W.), market town, Staffordshire, England; birthplace of Josiah Wedgwood; pottery. Pop. 50,000.

BURSUM, HOLM O. (1867), a U.S. Senator; b. at Fort Dodge, Ia. After a public school education he went to New Mexico, in 1881, engaged in stock raising, becoming also interested in politics. During 1899-1900 he served in the territorial senate, was a member of the constitutional convention, in 1910, in which he was Republican floor leader. In 1921 he was elected to the U.S. Senate for the term of 1921-25.

BURTON, MARION LEROY (1874), an American university president; b. in Brooklyn, Ia. Graduating from Yale University, in 1907, he taught Greek at the Carleton Academy, in Minn., later assistant professor at Yale. In 1910 he was elected president of Smith College, president of the University of Minnesota, in 1917, and since 1920 he has been president of the University of Michigan. Among his works are *The Problem of Evil*, 1909; and *On Being Divine*, 1916.

BURTON-UPON-TRENT

BURTON, RICHARD EUGENE (1861), an American college professor and poet; b. Hartford, Conn., March 14, 1861. After graduating from Trinity College (Conn.), in 1883, he was for a while managing-editor of *The Churchman*, in New York City. Later, in 1898, he became head of the department of English, in the University of Minnesota, which position he still holds. His work includes a number of collections of his own poetry, and critical writing on the drama and literature. Among the first are *Lyrics in Brotherhood*, 1899; among the others are *Masters of the English Novel*, 1909; *The New American Drama*, 1913; *Bernard Shaw—the Man and the Mask*, 1916; and *Charles Dickens—How to Know Him*, 1919.

BURTON, SIR RICHARD FRANCIS (1821-90), Eng. explorer and Orientalist; b. Barham House, Hertfordshire; joined Indian army (1842) and applied himself to study of Oriental life and languages; made a perilous pilgrimage to Mecca (1853); explored interior of Somaliland (1854) and lake regions of equatorial Africa (1857-58). Burton was app. British consul at Fernando Po (1861), Santos (1865), Damascus (1869), Trieste (1871); he was a voluminous author, and his translation of *Arabian Nights* (pub. 1885-88) is a striking testimony of his intimate knowledge of Eastern life. *Life*, by his wife, 1893.

BURTON, ROBERT (1577-1640), Eng. writer; b. Leicestershire; ed. Oxford and held studentship at Christ Church till death; *The Anatomy of Melancholy*, 1621; his *magnum opus*, is full of erudition and quotation; his magnificent prose style transcends his matter.

BURTON, THEODORE ELIJAH (1851), a U.S. Senator; b. in Jefferson, Ohio, Dec. 20, 1851. Graduating from Oberlin College, in 1872, he studied and practiced law, in Cleveland, Ohio. He was elected to the U.S. Congress, serving in the 51st to the 54th and in the 60th Congresses. He was elected to the 61st Congress, but soon after resigned to enter the Senate. At the Republican National Convention of 1916 he had the solid support of the Ohio delegation as nominee for the Presidency. He has written *Financial Crises and Periods of Industrial and Commercial Depression*, 1902; and *Some Political Tendencies of the Times and the Effect of the War Thereon*, 1919. He was a member of the American Debt Funding Commission, 1922-3.

BURTON - UPON - TRENT (52° 48' N., 1° 39' W.), market town, municipal and county borough, Staffordshire and Derbyshire, England; breweries cele.

brated since 1630; ironworks. Pop. 1921, 48,927.

BURU (3° 30' S., 126° 30' E.), one of Molucca Islands, Dutch E. Indies; mountainous, thickly wooded, and fertile; cajeput oil. Pop. c. 15,000.

BURY (53° 35' N., 2° 18' W.), market town, on Bolton canal, Lancashire, England; cotton spinning and weaving, also bleaching, dyeing, and print works; paper-making; freestone quarries, coal mines. Pop. 1921, 56,426.

BURY, JOHN BAGNELL (1861), Eng. historian; became religious prof. of Modern History at Cambridge (1902), having previously held professorships at Trinity Coll., Dublin; has written histories of Greece and Rome, and other scholarly works.

BURY ST. EDMUNDS (52° 15' N., 0° 43' E.), market town, Suffolk, England; named after Edmund the Martyr, in whose honor Canute founded abbey, 1020; two fine Gothic churches; celebrated grammar school; agricultural implements; cattle, wool, cheese. Pop. 1921, 16,050.

BUSACO (40° 24' N., 8° 14' W.), village, Portugal. On the S. slopes of Serra de Bussaco Wellington defeated the French, Sept. 1810.

BUSCH, JULIUS HERMANN MORITZ (1821-99), Ger. publicist; after extensive travels in Europe, America, and the East he entered the public service, and from 1870 until the chancellor's death, he was closely associated with Bismarck, upon whose life and times he pub. several books.

BUSH, IRVING T. (1869), American business man; b. Ridgeway, Mich. He received an academic education, and at the age of 19 entered the Bush and Denslow Manufacturing Company, of which his father was president, becoming secretary a year later. In 1895 he began establishing warehouses; founded the Bush Terminal Company (1902), and created the colossal system known as the Bush Terminal which covers over 200 acres in South Brooklyn, N. Y., and includes 123 warehouses, 8 piers, 16 model loft or industrial buildings and facilities for receiving, shipping, storing, selling and making goods. Over 250 manufacturing and wholesale establishments avail themselves of the Terminals' facilities. He is connected with other large business enterprises and is a member of numerous commercial and economic organizations.

BUSHIRE, BANDER BUSHIRE (28° 59' N., 50° 50' E.), chief seaport, Persian

Gulf, on sandy peninsula; extensive trade with Europe and East; exports opium, mother of pearl, carpets; imports cotton piece goods, sugar, tea, woolen and silk goods, iron; land terminus Indo-European telegraph line; occupied by British during Persian War, 1856-57. Pop. c. 20,000.

BUSHMEN, South African aborigines approaching extinction; short of stature, complexion of a dirty yellow; the skin hard and dry, and with little body-hair; while the males are slim almost to emaciation, there is much statopygy amongst the women. The only dress of the men is a strip of skin about the loins. They are great hunters, and very swift of foot. Their food consists of the half-cooked flesh of wild animals, insects, honey, and roots. They are also inveterate smokers. By nature they are savage and fearless, nomadic in their habits, gifted with considerable intelligence, and possessing ability in drawing and music. When civilized they prove very reliable.

BUSHNELL, HORACE (1802-76), Amer. divine; modified traditional Calvinism of his time.

BUSIRIS (classical myth.), Egyptian king, the offspring of Poseidon and Lyssianassa.

BUSK, GEORGE (1807-86), Eng. surgeon, zoologist, anthropologist, and palaeontologist; Hunterian prof. of Comparative Anat. and Physiology (1856), Royal Coll. of Surgeons; pres. Royal Coll. of Surgeons (1871).

BUSKIN, or *cothurnus*, the thick-soled, high, laced boot worn by Gk. and Roman tragedians; comedians wore a light shoe called *soccus* (sock).

BUSONI, FERRUCCIO BENVENUTO (1866), Italian composer; b. Empoli, Florence. His early training was under the tutelage of his parents, who were skilled musicians. In 1886 he studied at Leipzig, Germany. He taught at the Conservatory of Helsingfors in 1888; in 1890 was a professor at the Moscow Imperial Conservatory, coming to Boston the following year to teach in the New England Conservatory. Three years later he settled in Berlin, Germany. He is a gifted pianist, and has made many successful concert tours in America and Europe. He won the first Rubinstein prize and was made by France a chevalier of the Legion of Honor. His compositions include *Pajohlas' Daughter*, a symphonic poem; *Lustspiel Overture* and *Die Brautwahl*, opera, 1912.

BUSSAHIR, BASHAIR, BISAHIR

(31° 30' N., 78° 20' E.), hill state, Punjab, India; tributary, Brit. Government. Area, 3,862 sq. miles. Pop. 100,000.

BUSTARD (*Ovis*), genus of land-fowl numerous species of which are distributed in the Old World, and one in Australia. *O. tarda* was formerly common in Great Britain, and has been preserved as a game bird, but the native race became exterminated in the middle of the XIX. cent. Occasionally some find their way to S.E. England from the Continent. The finely plumed adult male measures about 8 ft. between the tips of the wings; the female is smaller.

BUSTO ARSIZIO (45° 37' N., 8° 52' E.), town, Lombardy, Italy; church designed by Bramante; cotton manufactures. Pop. 20,000.

BUTCHER, SAMUEL HENRY (1850-1910), Brit. classical scholar.

BUTE (55° 50' N., 5° 12' W.), island, Firth of Clyde; separated from Argyllshire by Kyles of Bute; coast rocky, numerous bays; undulating interior; highest altitude, Kames Hill, 875 ft.; several small lochs—principal, Loch Fad; excellent crops; fisheries; quarries; salubrious climate; chief town, Rothesay. Pop. 12,000.

BUTE, BUTESHIRE (55° 40' N., 5° 10' W.), county, Firth of Clyde, comprising isles of Bute, Arran, the Cumbraes, Holy Isle, Pladda, Inchmarnock; area, 139,658 acres. Pop. 20,000.

BUTE, JOHN STUART, 3RD EARL OF (1713-92), Brit. Prime Minister; succ. to earldom (1723); gained favor of Frederick, Prince of Wales (1747), and after Frederick's death (1751) obtained great influence over young prince, on whose accession (1760) he rose to power. In March 1761 he became Sec. of State, and in Nov. Prime Minister. His nationality, character as a favorite, advocacy of royal supremacy, and peace policy, made him very unpopular; he resigned (April 8, 1763), and withdrew from court (Sept.). Of a dilettante temperament, inexperienced in politics; his weak ministry was marked by gross corruption and intimidation.

BUTLER, a borough of Pennsylvania in Butler co., of which it is the county seat. It is on the Pennsylvania, the Pittsburgh and Western, and other railroads, and on Conemaugh Creek. It is the center of an important mining and natural gas region. Its industries include the manufacture of glass, flour, silk, brass and cars. There is a court house, hospital, public library and parks. Pop. 1920, 23,778.

BUTLER, ARTHUR GARDINER (1844), English biologist and author; b. Chelsea. He entered the South Kensington Art School in 1861. He had a pronounced trend toward the study of biology and in 1862 won a medal for his publication, *Outlines of Nature*. In 1863 he entered the service of the British Museum and in 1879 was placed in charge of the Department of Anthropods. He retired in 1901. His publications include *Lepidoptera Evolutio*, 1869; *British Birds' Eggs*, 1886; *Foreign Finches in Captivity*, 1895-96; and *Foreign Birds for Cage and Aviary*, 1908-10. In addition he has written many monographs on natural history subjects.

BUTLER, BENJAMIN FRANKLIN (1818-93), Amer. administrator, soldier, and lawyer; admitted to Massachusetts Bar (1840); delegate to Democratic national conventions (1848-60); member of Massachusetts House of Representatives (1853), of state senate (1859), and a Republican representative in Congress (1867-74, 1876-79); major-general U.S. Volunteers during Civil War.

BUTLER, CHARLES (1750-1832), Eng. legal and miscellaneous writer; pub. some fifty works, including *Horae Biblicae*, 1797; *Horae Juridicae Subsecivae*, 1804; *Book of the Roman Catholic Church*.

BUTLER, ELLIS PARKER (1869); American humorist; b. Muscatine, Iowa. His humorous gifts first found expression in *Pigs is Pigs*, which achieved a success that has not been surpassed by any of his later works, of which are many. These include *Great American Pie Company*, 1907; *That Pup*, 1908; *Mike Flannery*, 1909; *Water Goats*, 1910; *Adventures of a Suburbanite*, 1911; *The Jack-Knife Man*, 1913; *How It Feels To Be Fifty*, 1920; and *In Pawn*, 1921. He is secretary and treasurer of the Authors' League of America.

BUTLER, HOWARD CROSBY (1872), American educator and archaeologist; b. Croton Falls, N. Y. He was educated at Princeton and studied later at the Columbia School of Architecture and at the American Schools of Classical Studies in Rome and Athens. He headed archaeological expeditions to Syria in 1899, 1904 and 1909. He became professor of the history of architecture at Princeton in 1905. Among his publications may be cited *The Story of Athens*, 1902; *Architecture: Part II. of Publications of American Expedition to Syria*, 1903. He has also written many monographs and magazine articles on archaeological topics.

BUTLER, JOSEPH (1692-1752), Ang-

lican theologian and philosopher; ed. at Oxford; prebendary of Rochester, 1733; Clerk of the Court to Queen Caroline, 1736; bp. of Bristol, 1738 (soon after dean of St. Paul's in addition); bp. of Durham, 1750. His *Analogy of Religion*, pub. 1736, is often regarded as one of the greatest intellectual achievements of Anglicanism. He wrote against Hobbes's school and combated the then fashionable Deism. Beginning with the future life and moral government of the world, he goes on to Revelation and the importance of Christ's death, not merely the influence of His teaching; finally asserting that the fact that Christianity cannot be absolutely proved and is not universally accepted is no fatal objection. B. has been described as a wise rather than a learned man; he had little influence at first, but in XIX. cent. his greatness was realized.

BUTLER, NICHOLAS MURRAY (1862), Amer. educationist; pres. of Columbia Univ., New York, founded *The Educational Review*; pub. *The Meaning of Education, True and False Democracy, The American as he is, etc.*

BUTLER, PIERCE (1866), an Associate Justice of the United States Supreme Court; b. in Dakota co., Minn. He graduated from Carleton College in 1887. He was admitted to the bar in 1888 and engaged in general practice in St. Paul. He soon became known as one of the most competent lawyers in the city. He served as general attorney for several railroads and was a member of the Board of Arbitration for the acquisition of the Grand Trunk Railroad of Canada. In 1923 he was appointed by President Harding, a member of the United States Supreme Court to succeed Mahlon Pitney, retired.

BUTLER, SAMUEL (1612-80), Eng. satirical poet; s. of a small Worcestershire farmer; ed. King's School, Worcester; became a justice's clerk, and was subsequently in the service of the Countess of Kent, John Selden, Sir Samuel Luke, the Earl of Carbery, and the Duke of Buckingham. During these various secretarial occupations he had unique opportunities of observing men and manners, and it is this wide knowledge of life which makes his famous doggerel satire, *Hudibras* (a burlesqued knight), so lastingly attractive. The first part of the poem was pub. 1663, the second in 1664, and the third part in 1678. It consists of some ten thousand verses, and though perhaps little read, now its witty passages have become merged in everyday language; it contains such well-

known couplets as—
'Compound for sins they are inclined to
By damning those they have no mind to.'

BUTLER, SAMUEL (1774-1839), Eng. ecclesiastic and scholar; as headmaster raised Shrewsbury School to a high state of efficiency; app. bp. of Lichfield (1836); edit. works of Æschylus, and pub. a *Sketch of Modern and Ancient Geography*, 1813.

BUTLER, SAMUEL (1835-1902), Eng. author; grandson of the above, whose life he wrote; made a competence in New Zealand, and used his experience of colonial life in *Erewhon, or over The Range*, 1872. His other writings include works on Shakespeare's sonnets, the authorship of the *Odyssey*, and a novel (posthumously published), *The Way of All Flesh*. An artist and musician, he exhibited at the Royal Academy, and composed oratorios in manner of Handel.

BUTLER, WILLIAM ALLEN (1825-1902), Amer. lawyer and writer; his satirical poem, *Nothing to Wear*, 1857; was translated into French and German; prose works include a labor study, *Domesticus*.

BUTLER COLLEGE, a co-educational institution situated in Irvington, a suburb of Indianapolis, Ind. It is controlled by the Disciples of Christ, but is non-sectarian. It was originally known as the Northwestern Christian University. In 1906 it was named Butler College and became affiliated with the University of Indianapolis. The Indiana Law School and Indiana Dental College are associated with the institution. In 1922 its students numbered 875 and its faculty 37, headed by Dr. R. J. Alley.

BUTTE, a city of Montana, in Silverbow co., of which it is the county seat. It is on the Northern Pacific, the Great Northern and other railroads. Butte is one of the most important mining cities in the world, copper mining being the most important, although there are valuable gold and silver mines. The Anaconda copper mines are here as well as other important mines. Butte is the industrial center for southern and western Montana. It has many handsome public buildings, a public library, banks, and is the seat of the State School of Mines. Pop. 1920, 41,611.

BUTTER. A fatty substance derived from the milk of cows, goats, buffaloes, and other animals. It is composed of fat, casein, albumen, sugar, salt and water, the water composing over 87 per cent. The amount of fat contained in milk is between 3 and 4 per cent. and

this, when separated from most of the other ingredients of the milk, forms butter. Formerly all the butter was made in small quantities upon individual farms, but in the United States and elsewhere the larger proportion is now made in butter factories or creameries. These factories receive the milk and cream and make the butter in large quantities. The chief butter making countries in the world are the United States, Denmark, Sweden, England, Ireland and Australia. The United States exports a considerable quantity in normal times. During the World War butter was one of the commodities which rose greatly in price and its use was to a large extent superseded by substitutes, which in many cases were so perfected as to be with difficulty detected as not being real butter. Following the war, in 1921-22, there was an increased production in butter, largely because of the decreased production of condensed and evaporated milk. In spite of increased production, the price of butter did not materially decrease for several years following the end of the war. In 1921, 34,343,653 pounds of butter were imported to the United States, while 7,829,255 pounds were exported. The imports of butter in 1922 amounted to 9,551,292 pounds, and the exports to 7,511,997 pounds.

BUTTERCUP, common name of various yellow-flowered species of genus *Ranunculus*, from color and shape of flowers.

BUTTER-FAT. The fat or 'cream' in milk, where it exists as innumerable small globules. The process of churning causes these globules to run together and form a solid mass. The percentage of fat in cow's milk varies from $3\frac{1}{2}$ to 5 per cent. while ordinary butter contains on the average 82 per cent. Butter-fat is characterized, chemically, by its richness in water-soluble fatty acids, of which butyric, caproic, capric and caprylic are the most important. It contains about 40 per cent. of olefin, which explains its low melting point ($31-34^{\circ}$ C.). Butter-fat is the most easily digested of fatty foods, which renders it of great value in sickness, particularly in tuberculosis and diabetes. Cooking renders the fat less digestible, probably owing to the liberation of fatty acids. Of recent years it has been found to be rich in fat-soluble vitamin b, which fact is believed to account for its great value as an ingredient in children's diet. If butter is melted down and then heated gently until all the water is driven out of it, strained through muslin to remove casein, and then solidified and tightly covered, it will keep almost

indefinitely. This method is largely used in India and in parts of Europe.

BUTTERFIELD, DANIEL (1831-1901), American soldier; b. Utica, N. Y. He graduated at Union College, Schenectady, N. Y., in 1849, and entered the express business. He served throughout the Civil War and rose to high rank and distinction. He was in the Peninsula campaign in 1862, commanded the 5th Corps at Fredericksburg and was Chief of Staff at Chancellorsville under Hooker and at Gettysburg under Meade. He was with Hooker at the battle of Lookout Mountain, and in the closing period of the war commanded a division in many battles. At the close of the struggle he was brevetted major general in the regular army. Following his resignation in 1869, he was made chief of the U. S. Sub-Treasury in New York. He published *Camp and Outpost Duty*, 1862.

BUTTERFIELD, KENYON LEECH (1868), American educator; b. Lapeer, Mich. He received his education at the University of Michigan and the Michigan Agricultural College, becoming the secretary of the latter institution. He edited agricultural papers and served as superintendent of the Michigan Farmers' Institute, 1895-99. In 1903 he became president of the Rhode Island College of Agriculture and Mechanical Arts, and three years later assumed the presidency of the Agricultural College of Massachusetts. He was decorated by France in 1919. He has written many monographs on agricultural topics and has published *Chapters in Rural Progress*, 1908; and *The Country Church and the Rural Problem*, 1911.

BUTTERFLY. See **LEPIDOPTERA**.

BUTTERINE. See **OLEOMARGERINE**.

BUTTERNUT. (1) Seed of tree found in Brit. Guiana; kernel has pleasant taste and is rich in oil; trees are related to tea shrubs. (2) The more general use of name is for tree of walnut group, *Juglans cinerea*, native of N. America; the wood is dark yellow and takes on fine polish; seeds abound in oil.

BUTTRESS. See **ARCHITECTURE**.

BUTTRICK, WALLACE (1853), American clergyman; b. Potsdam, N. Y. He was educated at Ogdensburg Academy and under private teachers, and graduated from the Rochester Theological Seminary in 1883. In the same year he was ordained in the Baptist ministry and held a number of important pastorates. He was pastor of the First Church, New Haven, Conn. (1883-89), First Church, St. Paul, Minn. (1889-92),

Emmanuel Church, Albany, N. Y. (1892-1902). He served as secretary of the General Education Board from 1902 to 1917 and in the latter year became its president.

BUTYL ALCOHOLS, four organic compounds of the same composition ($C_4H_{10}O$) but different properties; *Isobutyl a.* smells like fusel-oil, in which it occurs.

BUTYRIC ACID ($C_4H_8O_2$), an organic acid contained in butter, with a powerful and unpleasant smell, which is noticed when butter becomes rancid, as the b. a. then separates from its union with glycerine; B. P. $163^\circ C.$; S. G. 0.975. This is *normal b. a.* ($CH_3CH_2CH_2COOH$).—*Isobutyrica* ($CH_3CH_2CHCOOH$), B. P. $155^\circ C.$; S. G. 0.97.—*Ethyl Butyrate* ($C_6H_{12}O_2$), Butyric Ether, Pineapple Oil, like most esters, has a fruity odor, and is used as a substitute for natural pineapple essence (the flavor of which is probably due to natural butyric ether) in sweets.

BUXAR, BAXAR ($25^\circ 30' N.$, $84^\circ E.$), town, Shahabad district, Bihar and Orissa, India; native army defeated by British, 1764. Pop. c. 14,000.

BUXTON, a watering-place and mkt. tn. in Derbyshire, 36 m. N.W. of Derby, and 163 N.W. of London by rail, and is on the L.N.W. and Midland Railways. Area, 1310 ac., and pop. 15,651. It is the highest tn. in England, 1000 ft. above sea-level, is the center of the Peak district, and is remarkable for its very bracing climate. It has long been famous for its mineral waters, which were known to the Romans. The springs supply hot and cold water, though only a short distance apart; the hot springs have an even temperature of $82^\circ F.$ The baths are the property of the Duke of Devonshire. At the Devonshire Hospital over 3000 poor gouty and rheumatic patients are treated annually. There are excellent hotels, hydropathics, and the various establishments that are to be found in a favorite watering-place. In the vicinity is Diamond Hill, so named from its abundance of quartz crystals; also Poole's Hole, a remarkable stalactite cavern.

BUXTON, SYDNEY CHARLES (1853), Eng. Liberal statesman; Postmaster-Gen., with seat in Cabinet, 1905; pres. of Board of Trade, 1911.

BUXTON, SIR THOMAS FOWELL, Bart. (1786-1845), Eng. brewer and philanthropist; ed. Trinity Coll., Dublin; m. Hannah, sister of Elizabeth Fry; became partner in the firm of Truman, Hanbury & Co., London brewers;

M.P. for Weymouth, (1818-37); devoted himself to prison reform and the abolition of slavery in the Brit. colonies, the latter of which he saw pass into law in 1833.

BUZANCY, vil., dep. Aisne, France ($49^\circ 18' N.$, $3^\circ 22' E.$), 5 m. S. by E. of Soissons; famous for the attack made by the 15th (Scottish) Division, operating with General Mangin's Fr. army, July 28, 1918. A memorial erected by the French on the battlefield in commemoration of their valor bears the inscription: 'Here the noble thistle of Scotland will flourish for ever among the roses of France.'

BUZZARD, group of birds of prey distinguished from the eagles in having a relatively shorter head and a straighter beak. *Buteo vulgaris* used to be common in England, and the rough-legged b. (*Archibuteo lagopus*) occasionally visits in winter.

BYBLOS, modern Jebail ($34^\circ 8' N.$, $35^\circ 38' E.$), ancient town, Phœnicia; center of worship of Adonis.

BYELAYA, TSEKOV ($49^\circ 46' N.$, $30^\circ 9' E.$), town, Kiev, Russia; commercial center; machinery; corn. Pop. 54,300.

BYELOSTOK ($53^\circ N.$, $22^\circ 35' E.$), town, W. Russia; cotton mills. Pop. 85,000.

BY-LAWS, originally the word by-law meant a law made by the local authority for the regulation of a town. It now means any law, rule, or regulation affecting the public, made by any corporation, or company, in pursuance of powers conferred by Act of Parliament. These by-laws must not contravene the law of the land, and in making them the corporation, or company, must not exceed the powers conferred by Parliament.

BYNG, JOHN (1704-57), Brit. admiral; sent to relieve Minorca, which French had attacked, he withdrew without fighting a battle; in consequence, Fort St. Philip surrendered; B. was tried and shot, March 14, 1757.

BYNG, JULIAN, 1ST BARON BYNG OF VIMY (1862), British soldier, seventh son of second Earl of Strafford, joined the 10th Hussars and served in Sudan expedition, 1884, and the S. African War, 1899-1902. In Great War commanded 3rd Cavalry Division, accompanying Rawlinson's 7th Division in Flanders; in May, 1915, succeeded Allenby in command of Cavalry Corps; in Aug., 1915, proceeded to Gallipoli to command 9th Corps (Suvla Bay); in

Feb., 1916, returned to France to command 17th Corps. In May, 1916, he was transferred to the Canadian Corps ('Byng Boys'), which he led at the Somme and at the famous capture of the Vimy Ridge, April 9, 1917. He succeeded Allenby in command of the 3rd Army, which gained striking but ephemeral success before Cambrai, Nov., 1917, stopped the Ger. onset on Arras, March, 1918, and played a prominent part in the final Allied offensive. In Aug., 1919, he was created a baron and voted grant of 30,000 pounds. Subsequently he retired from the army, and became chairman of the United Service Fund. In 1921 he was appointed Governor-General of Canada.

BYNNER, WITTER (1881), American playwright; b. Brooklyn, N. Y. He graduated from Harvard in 1902. He was assistant editor of McClures Magazine and literary editor for McClure Phillips & Co. (1902-6); advisory editor with Small Maynard & Company (1907-15.) He lectured on poetry and other literary subjects and contributed to many magazines. His publications include *Young Harvard*, 1907; *The Little King*, 1914; *The New World*, poems, 1915; *Iphigenia and Tauris*, play, 1915; *Any Girl*, 1917; *The Canticle of Praise*, 1919, *The Beloved Stranger*, poems, 1919; and *Pins for Wings*, 1920.

BY-PRODUCTS, secondary products produced in the course of manufacturing a principal product. The utilization of by-products, formerly allowed to run to waste, is essentially a modern development, and in certain industries by-products now form the main source of profit. The importance of by-products dates from the artificial production of aniline coloring matter from coal tar by the Eng. chemist Perkin in 1856. Other examples of profitable by-products are: industrial alcohol made from waste sulphite liquor in manufacturing paper from wood; tar and ammoniacal liquor got by distilling coal for illuminating gas. Besides dyes, many valuable drugs and flavoring and sweetening agents are obtained from coal tar products; tar, ammonia, and potash are recovered from blast furnaces smelting iron ores, while the slag is useful for paving, cement, and road metal; basis slag, a by-product in steel manufacture, is a valuable manure. Glycerine is a valuable by-product of soap and candle works.

BYRD, WILLIAM (1543-1623), Eng. composer; shared with Tallis the post of organist to the Chapel Royal; composed masses, part-songs, madrigals, etc., and his work takes high rank in the lit. of music. A number of his composi-

tions have been pub. in recent times, but much of his work still remains in manuscript.

BYRON ISLAND—(1) (1° 25' S., 177° 54' E.), island, Gilbert group, Oceania. (2) (47° 44' S., 75° 14' W.), island, Patagonia, S. America.

BYRON, GEORGE GORDON, 6TH LORD (1788-1824), Eng. poet; b. in London. He came of an old Derbyshire family, notorious for its stormy history. His great-uncle and predecessor in the title ('the wicked Lord Byron'), was tried by the peers in 1765 for the murder of Mr. Chaworth, but found guilty of manslaughter only; and his grandfather, Admiral Byron ('Foul-Weather Jack'), sailed round the world with Anson. His father was a dissolute scamp who married (as his second wife) Catherine Gordon of Gight, a small Scot. heiress, and squandered all her fortune. After his father's death in 1791, Byron lived with his mother (a violent, foolish woman, who made him exceedingly unhappy), chiefly in Aberdeen. He received his education first at Harrow and then at Trinity Coll., Cambridge, where he made the acquaintance of Hobhouse, afterwards Lord Broughton, and led a very riotous life. About this time he fell in love with Mary Chaworth, the heiress of his great-uncle's victim, and was rejected by her—a disappointment that had some bearing on his subsequent life.

In 1807 he published *Hours of Idleness*, which was 'cut up' by Brougham in the *Edinburgh Review*. In retaliation Byron wrote in 1809 his satirical poem, *English Bards and Scotch Reviewers*, and then set out on his tour through Europe, including in his travels Spain, Portugal, Greece and the Aegean Islands. On his return he issued (in 1812) the first two cantos of *Childe Harold*, describing his travels, and 'found himself famous.' For the next few years he was the darling of London society, contracting numerous liaisons with married women (notably Lady Caroline Lamb, wife of Lord Melbourne) and publishing his Oriental poems, *The Giaour*, 1813; *The Corsair* and *Lara*, 1814; and *The Siege of Corinth*, 1816. In Jan. 1815 he married Miss Milbanke, an heiress; in Dec. of the same year his daughter, Ada, was born, and his wife left his house. The reasons of this separation are not known. Being cast off by society, Byron went abroad and settled near Geneva where he met and came under the influence of Shelley, and formed an intimacy with Mrs. Shelley's step-sister, Claire Clairmont, who became the mother of Allegra Byron. At Geneva he wrote the fine Wordsworthian

canto iii. of *Childe Harold*, *The Prisoner of Chillon*, and began *Manfred*. From Geneva he went to Milan, thence to Venice, where he spent two years of ceaseless dissipation, and wrote *Mazeppa*, and the first two cantos of *Don Juan*, his masterpiece.

From his life in Venice he was rescued in 1819 by the Countess Guiccioli, with whom he lived for the next four years at Ravenna, Pisa, and Genoa. During this time he continued *Don Juan* and wrote his plays, *Marino Faliero*, 1820; *The Two Foscari*, and *Cain*, 1821; and his burlesque of Southey, *The Vision of Judgment*, 1821. At the instigation of Shelley (whom he met again in Pisa), in 1822 he entered into partnership with Leigh Hunt in editing *The Liberal*, which was, however, a failure. After Shelley's death, he raised money for the Gr. insurrectionists, and sailed to Missolonghi, where he died of fever (April 19, 1824). Byron's poetry has lately suffered undue eclipse; his earlier poems are garish and insincere, and his style is always slipshod, but his later poems show not only sympathy with the stormy side of nature, but also great powers of wit and satire. His *Don Juan* is not only the cleverest satirical poem in English literature, but also one of the most ingenious displays of rhyming in the language.

BYRON, HENRY JAMES (1834-83), Eng. dramatist and actor; first editor of *Fun*; wrote numerous comedies and extravaganzas, and achieved remarkable success with *Our Boys*, which had a three years' run at the Vaudeville Theater (Jan. 1875-April 1879). Another popular success was *The Upper Crust*, written for J. L. Toole.

BYRON, HON. JOHN (1723-86), Eng. vice-admiral; 2nd s. of 4th Baron B.; grandfather of poet; sailed round the world with Anson; the elements were generally unfavorable to his naval engagements, and he won the sobriquet of 'Foul-Weather Jack'; Gov. of Newfoundland, 1769.

BYZANTINE EMPIRE, EASTERN EMPIRE, LOWER (OR LATER) ROM. EMPIRE.—The Byzantine Empire was founded by Constantine the Great, who in 326 A.D. moved his capital to Byzantium, henceforth called Constantinople. The double change which had fallen upon the Rom. Empire was marked by the city's dedication in 330 by Christian bp.'s to the Virgin Mary. The pagan mistress of the world had become a Christian state and was to develop into a merely Eastern power. It remained the bulwark of civilization throughout the Dark and Middle Ages, and then the

Italianate-Gk. city, in its turn overrun by barbarian conquerors, became the parent of the Renaissance (q.v.).

The modern view differs from that of Gibbon, who called his history of the B. E. its *Decline and Fall*. From its foundation, 326, to its capture by Turks, 1453, the B. E., allowing for differences of race, prospered, or the reverse, after the normal fashion of a mediæval state. For some time the Rom. Empire remained intact, although on Constantine's death the system of Eastern and Western Augustus was reverted to, but in the V. cent. it finally lost its western provinces. Visigoths, crossing the Danube, won the great victory of Adrianople, 378. Goths and Vandals streamed into Europe and the legions withdrew from realm after realm. In 476 Romulus Augustulus, who had deposed Julius Nepos, was displaced by the Teutonic ruler Odoacer, and the Rom. Empire in the West came to an end. The Eastern Empire had meanwhile successfully repelled Teutonic attacks (the Goths being massacred and expelled by the populace at Constantinople, 401), became an object of great reverence to the new Teutonic kingdoms, and served, until its fall, the purpose of European outpost against Asiatic invasions.

The Emperor Justinian (ruled 527-65), lawgiver and builder of Santa Sophia, with the aid of his generals Belisarius and Narses, reconquered some western provinces, including Rome; his court exhibited Alexandrian splendor and vice; his wars and extravagance brought about the decline of VII. cent., when Italy was recaptured by Lombards, Slavs and Bulgarians settled in Balkan peninsula, Avars captured Dacia, Pannonia, etc. Persians attacked Syria, sacked Jerusalem (614) and assaulted Constantinople, and after defeat of Persians, Saracens conquered Egypt and Syria and threatened Asia Minor. Territory was permanently reduced; civilization decayed.

Leo de Isaurian (717-40) by a series of victories fatally weakened the Saracens. The Macedonian Dynasty (867-1056) ruled the empire in its last great age; the Saracens became a negligible power; Constantinople became the trading center of the world; Bulgaria became a Christian, dependent state, Basil II., 'Slayer of the Bulgarians,' reducing it, 1018; Russia became Christian ally. The empire steadily declined after the Macedonian rule; the Seljukian Turks under Alp Arslan won the great battle of Manzikert, 1071, taking Emperor Romanus IV. prisoner, and founded Turk. kingdom of Rum. The appeal of Emperor Alexius Comnenus I. (1081-1118) to Christian princes for aid

against the Turks brought about the First Crusade. The greed and self-seeking of the Crusaders ultimately caused the B. E.'s fall.

The empire had also to face Christian aggression in Italy; with aid of Venice the Normans were for some time kept in check, but ultimately founded a state in southern Italy and Sicily. The reign of Isaac Angelus, one of the last Comnenians, proved fatal to the empire. Bulgaria successfully revolted against his taxation; he was temporarily deposed; and in 1204 Venice diverted the Fourth Crusade against Constantinople; the capital was sacked, and the empire dismembered by the Crusaders.

The Greeks for some time elected a titular emperor, and in 1261 the Emperor Michael Paleologus captured Constantinople, but with difficulty maintained his position. The Empire finally fell before the attack of Ottoman Turks, who captured Philadelphia, 1393, and overran Bulgaria. After some delay Constantinople was besieged, 1422. Europe in terror sought to assemble a crusading army, but the sole aid against the infidel was given by Hungary. In 1453 a new and final siege commenced. Constantine XI. died fighting, and on the following day the city was stormed. The combined attack of East and West had at length proved fatal, and the capital of Gk. Christendom had finally passed into the infidel's possession.

The Rom. emperor of the East re-

tained much of the power of the *Pontifex maximus*, presiding at ecclesiastical councils, ratifying and making canon law. The patriarch, nominal head of the Church, usually proved obedient. Until the loss of the West the see of Constantinople was subordinate to that of Rome, but the former soon became independent and took differing course on many doctrines. The Gk. patriarch was excommunicated by Pope Leo IX., 1054, and the schism has never been more than temporarily healed.

BYZANTIUM, (41° 2' N., 28° 58' E.) town, on site of modern Constantinople, at entrance to Bosphorus; founded in 667 B.C. by Gk. colonists from Megara; taken by Persians, 515 B.C.; some time under control of Athens, V. cent. B.C.; independent from IV. cent.; destroyed by Severus, 196 A.D.; rebuilt as Constantinople, 330 A.D.

BZURA, riv., Poland (51° 51'-52° 23' N., 19° 23'-20° 14' E.), trib. Vistula, flows in westerly direction N. of Lodz, then proceeds E. to Lowicz, afterwards turning N. to the Vistula, which it enters opposite Vyzogrod, 40 m. N.W. of Warsaw. In the World War the Russians held the line of the lower Bzura, continued by its trib. the Rawka, against the Ger. assaults on Warsaw (Nov.-Dec. 1914, and Jan.-Feb. 1915), but withdrew practically without fighting in their great retreat in the latter half of 1915.

C

C, the third letter of the Latin alphabet; originally there was no distinction between this letter and G. As a numerical the letter signifies 100.

CA IRA, a famous Fr. street ballad which was popular at the time of the Revolution.

CAB (from Fr. *cabriolet*), a two- or four-wheeled vehicle used in France as early as the XVII. cent.; first introduced into England about 1820. Originally this kind of carriage was a high, two-wheeled gig, with movable hood, accommodating two persons. A later development of the vehicle was the Hansom, patented by an architect named Hansom, in 1834. Four-wheeled cabs, or *growlers*, first came into use in England about 1836; motor-cabs in 1897.

CABAL, small group of persons united in a cause which calls for intrigue; especially Cabal whose names—Clifford, Arlington, Buckingham, Ashley, Lauderdale, who carried out Charles II.'s unpatriotic Fr. policy—formed anagram cabal.

CABALLERO, FERNAN (1796-1877), Span. novelist; *nom de plume* of Cecilia Francisca Larrea, author of numerous hist. and other stories which achieved great popularity. Her most famous work, *La Gaviota* (1849), was trans. into most European languages.

CABANIS, PIERRE JEAN GEORGE (1757-1808), Fr. physician and author; prof. of Hygiene, 1795; prof. of Legal Med. and History of Med., 1799; École de Médecine, Paris; friend and physician of Mirabeau; one of the leaders of the Revolution.

CABARRUS, FRANÇOIS (1752-1810), Fr. financier; spent most of his life in Spain, where he acted as Minister of Finance under the Bonaparte régime.

CABATNAN (10° 52' N., 120° 28' E.), town, Panay, Philippine Islands; rice. Pop. 18,000.

CABBAGE, vegetable; the wild c. (*Brassica oleracea*), is the ancestral species of all cultivated varieties of

c's, kales, broccoli, and cauliflowers; thrives in deeply-dug, well-manured clay or loam soil, which should be rolled before planting and frequently stirred and hoed afterwards. They are planted when about 3 in. tall, 1 to 2 ft. apart each way. Enemies include: Club, or 'finger-and-toe,' caused by maggot of cabbage weevil—remedied by deep digging, stirring of soil, liming; caterpillars of cabbage butterfly—removed by hand-picking; slugs—by trapping.

CABBAGE BUTTERFLY, common large white garden butterfly; lays eggs on under surface of cabbage leaves, which remain about a fortnight before hatching; larvæ very voracious

CABBAGE FLY (*Anthomyia brassicæ*), dipterous insect similar in appearance to common house fly; lays eggs beneath skin of root-stems of cabbages and allied plants, and larvæ eat their way through roots and stems.

CABBAGE MOTH (*Mamestra brassicæ*), nocturnal moth of Noctuidæ family; larvæ very destructive to heart of cabbage.

CABBAGE PALM (*Oreodoxa oleracea*), lofty palm of W. Indies; head, a huge terminal bud, used as vegetable. Fruit yields an oil, and stem a sort of sago.

CABBAGE TREE (*Cordyline australis*), woody plant of Lily family found in New Zealand; old specimens 15 ft.-40 ft. high; furnishes strong, durable fibre, very resistant to water, and used for rope making; leaves recommended for paper making.

CABEIRI (classical myth.), minor deities, represented as dwarfs, who were the objects of secret worship, chiefly in the Gk. islands of Lemnos and Samothrace.

CABELL, JAMES BRANCH (1879), American author b. at Richmond, Va., and educated at William and Mary College. For a year he was instructor of French and Greek at William and Mary, and later worked on the Richmond Times, the New York Herald and the Richmond News. In 1902 he began

contributing to the magazines, writing essays, short stories, translations and papers on historical and biographical subjects, and conducting research work both in America and Europe. For two years he worked in a coal mine in West Virginia, and later became Historian of the Virginia Society of Colonial Wars. Many of his novels have attracted much attention, and one or two, indeed, considerable discussion. Amongst the best-known are *Jurgen*, *Gallantry*, *The Line of Love* and *The Cords of Vanity*.

CABELL, JAMES LAWRENCE (1813-89), Amer. physician, born in Nelson co., Va., and educated at the University of Virginia. He studied medicine in Baltimore, Philadelphia and in Paris, later becoming professor of anatomy and surgery in the University of Virginia. He was in charge of the Confederate military hospitals during the Civil War and was the author of *The Testimony of Modern Science to the Unity of Mankind*.

CABET, ETIENNE (1788-1856), Fr. communist; wrote a *Histoire de la Revolution de 1830*; established a communist colony on the Red River, Texas, which proved a failure.

CABINET, a body of official advisers of the executive authority of a state. It usually includes, if not all, at least the most important members of the Government. In the United States there does not exist any constitutional provision for a 'cabinet.' However, the heads of the several administrative departments of the Government compose the cabinet of the President of the United States. They are appointed by the President, subject to confirmation by the Senate. They do not, as in many foreign systems, hold seats in the Congress. They are responsible to the President, who, in turn, is responsible to the people for the acts of the Government, though cabinet members are subject, within certain limitations, to impeachment by Congress. In the order of succession to the President, as provided by Acts of Congress, they are: (1) The Secretary of State, (2) The Secretary of the Treasury, (3) The Secretary of War, (4) The Attorney General, (5) The Postmaster General, (6) The Secretary of the Navy, (7) The Secretary of the Interior, (8) The Secretary of Agriculture, (9) The Secretary of Commerce, (10) The Secretary of Labor.

In Great Britain the cabinet is a committee of leading members of the two Houses of Parliament nominated by the Crown. Its membership is generally restricted to statesmen belonging to the

majority party, though under exceptional conditions—as during and after the World War—members of minority parties have become members of so-called Coalition Cabinets. Only the heads of the most important administrative departments of the Government are included in the cabinet. The head of the cabinet is known as Prime Minister or Premier. The King is constitutionally obliged to take the cabinet's advice. The cabinet is collectively responsible to Parliament.

CABINET NOIR (Fr.); Fr. Government office, where the letters of obnoxious or suspected persons were secretly opened. The practice was in vogue from the XVII. cent. down to the Napoleonic period.

CABLE.—(1) large, strong rope, usually of 3 or 4 strands of hemp, jute, or coir, or of wire and chain, such as are used for ships' anchors. Chain c's are generally made in eight lengths of 12½ fathoms each, shackled together. (2) nautical measure—200 yards, (e.g.) length of 100 fathoms, or one-tenth of a nautical mile.

CABLE, GEORGE WASHINGTON (1844), American writer, b. at New Orleans, and educated in the public schools. From 1863-5 he served with the 4th Mississippi Cavalry, C.S.A.; and later was, for a time a reporter on the staff of the New Orleans Picayune. He also contributed to Scribner's Magazine, and since 1879 has devoted himself entirely to literature. He is the founder of the Home Culture Clubs, now known as the Northampton People's Institute, an institution having as its object the dissemination of culture amongst the working classes. He wrote *Old Creole Days*, *The Grandisimes*, *Dr. Sevier*, *Bonaventure* and numerous other books.

CABOT, GEORGE (1751-1823), Amer. politician; a leading authority in commercial affairs; in politics a Federalist, and member of the 'Essex Junto' was bitterly attacked by more advanced Republicans.

CABOT, JOHN (1450-98), Ital. navigator; b. Genoa; naturalized at Venice 1476; settled in Bristol 1490; subsequently sailed from Bristol, May 2, 1497, under letters patent received from Henry VII. 1496; discovered Cape Breton Island; sailed again May, 1498, explored southern coast of Greenland and reached modern Baffin Land, which he believed to be mainland of Asia; sailed farther along coast, but returned to England in autumn, 1498. His s. Sebastian (c. 1474-1557) took part in 1497 expedition; after life of travel became gov. of

CABOT

London Company of Merchant Adventurers, 1551.

CABOT, RICHARD CLARKE (1868), American physician, s. of James E. and Elizabeth Dwight Cabot. Graduated from Harvard in 1889, and from Medical School in 1892. Chief Medical Staff of Massachusetts General Hospital, 1912-1921, and professor of medicine, Harvard Medical School, since 1919. Lieut.-Col. U.S. Medical Reserve Corps, 1917-1918. Service in France, 1917-1919. Author, *Physical Diagnosis*, 1901-1919 (seven editions); *Laymen Handbook of Medicine*, 1916; *Rewards and Training of a Physician*, 1917, and *Social Work*, 1918.

CABRA (37° 29' N., 4° 29' W.), town, Cordova, Spain; Moorish antiquities; wine. Pop. 14,000.

CABRAL, PEDRO ALVAREZ, CABRERA (d.c.1501), Portug. navigator; planted Portug. flag in Brazil, which he called Santa Cruz, 1500.

CABRERA (39° 5' N., 2° 55' E.), one of Balearic Islands, Spain.

CABRERA, RAMON (1806-77), Span. Carlist general 1833-40 and 1848-49; b. Tortosa; exiled for participation in Carlist conspiracies, and subsequently submitted to Alfonso XII.; d. in London.

CABUL. See **KABUL**.

CACAO, see **COCOA**.

CACCAMO (37° 55' N., 13° 37' E.), town, Palermo, Sicily; agate, beryl, jasper. Pop. 12,000.

CACCINI, GIULIO (1550-c. 1614), Ital. composer; deeply influenced by Renaissance and pioneer of classical opera.

CACERES (39° 40' N., 6° 15' W.).—(1) province, Spain; sheep and pig-rearing. Area, 7,667 sq. miles. Pop. 1910, 424,478. (2) capital of province, ancient *Castra Coccolia*; Rom. antiquities. Pop. 17,000.

CACHAR, KACHAR (24° 45' N., 92° 50' E.), district, Assam, India; area, 2,063 sq. mi. Pop. 420,000.

CACHALOT. See **SPERM WHALE**.

CACHET, LETTRE DE, Fr. writ. corresponding to Eng. Close Writ (*q.v.*); signed with king's name, countersigned by Sec. of State, and closed by royal seal (*cachet*); so called XVI. cent. onwards; previously variously known as letters close, letters of the little signet, *lettres du petit cachet*.

CACHOEIRA (12° 30' S., 39° 5' W.), town, Bahia, Brazil; commercial center; cigars. Pop. 12,600.

CADENCE

CACIQUE, CAZIQUE, name given to chiefs of native tribes of Central and S. America.

CACODYL, KAKODYLE, organic compound of carbon, hydrogen, and arsenic.

CACTUS (= prickly plant), green, succulent, mostly leafless spiny plants, with globular, columnar, flattened, or angled, often grotesquely shaped stems, and sessile, usually large and showy, flowers, natives exclusively of tropical America; formerly classed into one genus, *Cactus*; now subdivided into about 18 genera, comprising about 1,000 species. The most commonly cultivated in greenhouses are *Cereus*, *Opuntia*, *Phyllocactus*, *Mammillaria*. The fruit of *Opuntia ficus indica*, the prickly pear or Indian fig, is eaten in America and S. Europe, and the fleshy stems of *Melocactus* and others are eaten by cattle in dry districts of S. America. Some species (*e.g. Cereus*) attain a height of 50 ft.

CACUS (classical myth.), giant s. of Vulcan, who inhabited cave of Aventine Hill; slain by Hercules.

CADAHALSO, JOSÉ DE (1741-82), Span. author and soldier; spent several years in European travel and study; killed at Gibraltar 1782; author of a tragedy, *Don Sancho Garcia*, 1771; also of poems and satires; *Works*, Madrid, 1823.

CADAMOSTO, ALVISE DA (1432-77), Venetian explorer; entered the Portug. service under Prince Henry the Navigator; discovered the Cape Verde Islands; famed for his explorations of the coast of W. Africa and the rivers Gambia and Sengal.

CADDIS-FLY, name for neuropterous insects of the family Phryganeidae. The elongated larvæ live in water, and surround themselves with a tube consisting of small fragments of gravel, wood, etc., agglutinated by the secretion from a 'spinning gland.'

CADDO, small N. Amer. Indian confederacy, occupying a district of Oklahoma. They are a people of considerable intelligence and of industrious habits.

CADE, JACK (d. 1450), Eng. rebel; leader of the Kentish insurgents, 1450. He marched on London with 20,000 men, and after defeating a force sent against him by Henry VI., entered the city. His triumph was short-lived. Driven out of London by the citizens, his followers dispersed, and he became a wanderer; was captured, and d. of wounds received in the struggle.

CADENCE, the act of modulation; the

CADER IDRIS

gradual fall of the voice at the end of a phrase or sentence.

CADER IDRIS (52° 42' N., 3° 54' W.), mountain ridge, Merionethshire, Wales; peak, 2,914 ft.

CADET, younger son of an influential family; official name of a youth being trained as an officer in the Brit. navy; youth undergoing a system of military training.

CADI, Mohammedan ecclesiastical judge who administers the canon law of Islam.

CADILLAC, a city of Michigan, the county seat of Wexford co. It is on the Ann Arbor and other railroads. The city was formerly the center of an important lumbering region but this industry has now diminished in importance. There are manufactures of furniture, machinery and chemicals. The public institutions and buildings include a hospital, city hall, court house, and public library. Pop. 1920, 9,734.

CADIZ (10° 56' N., 122° 19' E.), town, Negros Island, Philippines.

CADIZ (36° 30' N., 5° 40' W.), province, Andalusia, southern Spain; bordering Atlantic and Strait of Gibraltar; mountainous; well watered; active industries; sherry wine, fishing, fruit; in south is Cape Trafalgar, where Nelson fought and d., 1805. Area, 2,834 sq. miles. Pop. 1919, 475,593.

CADIZ (36° 32' N., 6° 17' W.), famous port, Spain; on narrow tongue of land projecting into Atlantic; founded by Phœnicians c. 1100 B.C.; Roman *Gades*; burned by Drake, 1587; has two cathedrals, various educational institutions, and watch-tower 100 ft.; exports wine, salt, corks, canary seed, tunny-fish, olives, olive oil; graving docks, ship-building yards, sugar factory, ammonia, and chemical manure works; manufacture of glass, woolsens, hats. Pop. 63,100.

CADMIUM (Cd.—111.9), rare metallic element, chemically resembles zinc, obtained from zinc blende by distillation, in color like tin, but harder, ductile, and malleable, S.G. 8.6, M.P. 315°, B.P. 860°; its sulphide (CaS), or 'cadmium yellow,' used as a pigment.

CADMAN, CHARLES WAKEFIELD (1881), American composer. Studied with Leo Oehmler, W. K. Stiner, and Von Kuintz. Organist in Pittsburgh Churches. Published in 1904 organ pieces and ballads. Later became interested in Indian music. Wrote Indian songs, secured phonographic records of Indian songs and pieces for flute. Composer of *The Vision of Sir Launfal*,

CÆCILLA

The Morning of the Year, Four American Indian Songs, Three Songs from The West, The Garden of Mystery, The Red Rivals.

CADMAN, SAMUEL PARKES (1864), American clergyman; b. Shropshire, England. He was educated at Richmond College, University of London and holds degrees from Wesleyan (Conn.), Syracuse, Columbia Universities and the U. of Vt. From 1895-1901 he was pastor of the Metropolitan Temple, New York City. Since 1901 he has been pastor of the Central Congregational Church, Brooklyn, N. Y. He is an ex-chaplain of the 23rd Regiment, N.Y.N.G. and a trustee of various religious and educational institutions. Author: *Charles Darwin and other English Thinkers, The Victory of Christ-mas, The Religious Uses of Memory, Life of William Owen, The Three Religious Leaders of Oxford, Ambassadors of God.*

CADMUS, legendary founder of Thebes; s. of Agenor, king of Phœnicia and bro. of Europa; m. Harmonia, dau. of Ares and Aphrodite, and is said finally to have become king of Illyria.

CADORNA, LUIGI, COUNT, an Italian general; b. in Pallanza in 1850. He was educated at a military school and the Italian Staff College. At the outbreak of the World War, when he held the rank of lieutenant-general, he was made chief of the general staff. When Italy, in 1915, entered the war on the side of the Allies, Cadorna became commander-in-chief of the Italian armies. In the face of tremendous difficulties he filled this command, in the main, with success until October, 1917, when the Italians were decisively defeated by combined Austro-German armies and had to retreat to the Tagliamento and finally to the Piave. As a result of this debacle Cadorna was retired.

CADOUDAL, GEORGES (1771-1804), Fr. Chouan leader; during the Revolution a very active partisan of the royalists, and refused all overtures of Napoleon, who sought to win him over; eventually captured and executed in Paris.

CADRE, list of officers of ship or regiment.

CADUCEUS (classical myth.), the wand or staff of Hermes ('the herald Mercury'), messenger of the gods; also recognized by the Greeks as the herald's mark of office.

CÆCILLA, S. American species of primitive worm-like Batrachia of the order Gymnophiona.

CÆCILIUS, Gk. rhetorician, who fl. at Rome during the Augustan age; only fragments of his numerous works remain; edit. by Ofenloch, 1907.

CÆCILIUS STATIUS (d. 168 B.C.), Rom. comic dramatist, fragments of whose plays are to be found in Ribbeck and Aulus Gellius.

CÆCINA, AULUS (d. 79 A.D.), Rom. general; noted for ambition and treachery; entered the service of Galba, but transferred himself to that of Vitellius, and was defeated by Suetonius at Cremona; later he found favor with Vespasian, but, entering into a conspiracy against him, was put to death.

CÆDMON, (c. 660), the first Eng. poet. All that we know of him is drawn from Bede, who tells us that he was a Northumbrian herdsman, who received miraculously the gift of song and wrote several poems on Biblical subjects, finally dying in Whitby Abbey. Of his works in their original Northumbrian dialect only the nine opening lines of a *Hymn on the Creation* exist today. When the Northumbrian missionaries evangelized the Old Saxons of Germany they taught them C.'s poems, whence arose the Old Saxon poem on the *Heliand* (or 'Saviour'), and another on *Genesis*, which was trans. into West Saxon dialect of England. These two fine poems, Old Saxon *Heliand*, and West, or Anglo-Saxon *Genesis*, give us a distant impression of C.'s powers; *Genesis* influenced Milton in his writing of *Paradise Lost*.

CAEN (49° 11' N., 0° 21' W.), city, Calvados, France; on Orne and Odon; ancient capital of Lower Normandy; univ. founded by Henry VI. of England; Hôtel de villa; museums; principal churches, St. Etienne, La Trinité, 1066; and St. Pierre; founded by William the Conqueror; taken by English, 1346 and 1417; retaken by French, 1743; lace, cider, dairy produce, etc. Pop. 45,000.

CÆRE (41° 59' N., 12° 6' E.), ancient city, Italy; Etruscan ruins; modern Cerveteri.

CAERLEON (51° 37' N., 2° 58' W.), town, Monmouthshire; Roman ruins, notably a large amphitheatre known as 'King Arthur's Round Table.' Through Tennyson C. has become associated with the exploits of King Arthur.

CAERPHILLY (51° 35' N., 3° 14' W.), market town, Glamorganshire, Wales; ruins of fine XIII.-cent. castle; coal, ironworks. Pop. 30,000.

CÆSALPINUS, ANDREAS (1519-1603), Ital. scientist; was physician to Clement VIII., and the most famous botanist of his day.

CÆSAR, name of family of Rom. gens *Julia*, to which belonged Julius C.; assumed by his adopted s., Octavius, first Rom. Emperor, and became synonymous with imperial ruler; from 136 borne by Emperor's successor designate; revived in form, Kaiser, when kings of Germans became Holy Rom. Emperor in Middle Ages; adopted as Tsar, or Czar, by Russ. Emperor.

CÆSAR, GAIUS JULIUS (102-44 B.C.), Rom. general and dictator; bound to democrats by family ties, although of patrician blood, he distinguished himself in army in East and in third Mithradatic War. Identifying himself with democrats, he became curule sedile 65 B.C., pontifex maximus, 63, prætor, 62 B.C. In 60 B.C. he persuaded Pompey and Crassus to support him ('First Triumvirate') against the oligarchy in his Consulship 59 B.C. He carried an Agrarian Law and secured governorship of Gaul for five years. By 51 B.C. he had reduced Gaul to a tribute-paying province. In 56 B.C. his command in Gaul, which should have expired March 1, 54 B.C., was renewed till 49 B.C.

After Crassus' death, 53 B.C., Pompey drifted apart from C. He passed a law 'de jure magistratum' 52 B.C., which made it possible to call C. to account for unconstitutional acts. The quarrel between C. and Pompey subsequently ended in Pompey's defeat 48 B.C. Having defeated at Zela 47 B.C., C. returned to Italy. His victory of Thapsus 46 B.C., was death-knell of Pompeian cause. In July he received the dictatorship for ten years. Next year he crushed a rising in Spain, and then returned to Rome and undertook reorganization of Roman state. His measures were moderate and practical. He revived the Gracchan designs of transmarine colonization, extended local self-government, encouraged agriculture, and reformed provincial administration, but his government gradually tended towards undisguised absolutism, and he was assassinated March 15, 44 B.C. A brilliant and original soldier, a forceful administrator and great statesman, C. founded the new monarchy at Rome. His assassination could not prevent the Empire.—See *Rome* (Ancient History).

CÆSAREA MAZACA (38° 40' N., 35° 20' E.), ancient city, Cappadocia, Asia Minor; modern Kaysarieh.

CÆSAREA PALESTINA (32° 30' N., 34° 50' E.), seaport, Palestine; founded by Herod I., 13 B.C.; now ruins.

CÆSAREA PHILIPPI, C. PANEAS

(32° 12' N., 35° 42' E.), town, on Jordan, foot of Mount Hermon, Palestine; now Banias.

CÆSAREAN SECTION, the operation for removal of a foetus from the womb by means of abdominal section, so called from a story of its being practiced at the birth of Julius Caesar.

CÆSARION (47-30 B.C.), Caesar's putative son by Cleopatra; put to death by Augustus.

CÆSURA (lit. 'a cut'), in prosody, a pause usually in the middle of a line of verse, but variable, according to the form of stanza, thus:—

While fâvor fêd my hôpe, .1 deliight
with hôpe was brôught;

or,
At once, .11 as fâr as ângel's ken, .11 he
views

The dismal situâtion .11 wâste and wîld.

CÆSTUS, boxing-gloves used by the ancient athletes.

CAFFEINE, THEINE (C₈H₁₀N₂O₂. H₂O), alkaloid obtainable from coffee, tea, guarana, Paraguay tea, kola nut, and cocoa (in small quantity); white, silky, crystalline substance; powerful heart stimulant.

CAFFERY, JEFFERSON (1886), s. of Charles Duval and Mary Sterling Caffery. Graduated at Tulane University in 1906 and admitted to bar in 1909. Entered diplomatic service as Secretary of Legation [at Caracas, Venezuela, in 1911. Has since been assigned to posts at Stockholm, Paris and Madrid. Has also been the United States representative at various European conferences, since the war, on subject of care and betterment of war cripples.

CAFFIERI, JACQUES (1678-1755), Fr. metal worker; the most famous craftsman of his period in metal-work, and largely patronized by Louis XV. and other eminent persons.

CAGLI (43° 32' N., 12° 37' E.), town, Italy; bp.'s see. Pop. 3,300.

CAGLIARI (39° 13' N., 9° 6' E.), capital of Sardinia, on bay, S. coast; fortified; large harbor, dockyards; seat of univ.; residence of viceroy and abp.; old castle and cathedral; remains of Rom. amphitheatre; grain, wine. Pop. 61,175.

CAGLIOSTRO, ALESSANDRO, (1743-95), Ital. alchemist and charlatan; real name, Giuseppe Balsamo; traveled widely, making money by alchemy; d. in prison.

CAGNOLA, LUIGI (1762-1833), Ital. architect; designed the Arco della Pace, the Porta di Marengo, and the Chapel

of Santa Marcellina, all at Milan, and numerous other architectural works.

CAGOTS, a scattered race found in Gascony, Brittany and Basque provinces. During Middle Ages they were shunned as outcasts.

CAHILL, THADDEUS (1867), inventor; b. Iowa. He was educated at Oberlin, O., High School and Academy and at George Washington University. After having been admitted to the bar in 1894 he practiced law for several years. He invented the electric typewriter and a process for reproducing music electrically, known as telharmony, by means of which is transmitted from a central station to telephonic receiving instruments on the premises of subscribers. His laboratory is located in New York City where he is president of the N. Y. Cahill Telharmonic Co.

CAHITA, N. Amer. Indian tribes living in Mexico.

CAHOKIA, tribe of N. Amer. Indians.

CAHORS (44° 26' N., 1° 27' E.), city, Lot, France; on rocky peninsula, almost surrounded by river Lot; ancient bridge; univ. founded by Pope John XXII.; united with Toulouse Univ., 1751; native place of Gambetti and poet Marot; bp.'s see; wine, brandy. Pop. 14,000.

CAIATA (41° 10' N., 14° 20' E.), ancient city, Campania, Italy; bp.'s see; modern Calazzo.

CAICOS AND TURK'S ISLANDS, group S. of Bahamas, Brit. W. Indies (21° 26' N., 71° 10' W.), under government of Jamaica; thirty small cays; eight inhabited; salt, sisal fibre, sponges, and turtle-shell; hot but healthy. Area, 165 sq. m.; pop. 5,600.

CAILLAUX, JOSEPH (1863), Fr. statesman; early entered Parliament, and soon was in high position in government; minister of finance, 1910; premier, 1911; but conduct of Franco-German Morocco crisis led to his fall. Again held portfolio of finance, 1914, but tragic murder by his wife, Mme. Caillaux, of M. Gaston Calmette, editor of Figaro, March 1914, drove him from office. Mme. Caillaux was acquitted after trial of five days. In 1918 M. Caillaux was arrested for intriguing with the enemy, but was not brought to trial till 1920, when the High Court of Justice found him guilty and passed sentence of three years' imprisonment and deprivation of civic rights for ten years. Having already been in prison for nearly three years, he was at once liberated.

CAILLÉ, RENÉ AUGUSTE, CAILLÉ

CAIMAN

(1799-1838), Fr. traveler; penetrated to Timbuktu, 1827-28; pub. *Journal of Travels through Central Africa*.

CAIMAN, see ALLIGATOR.

CAIN. See ABEL.

CAIN, JAMES WILLIAM (1860); son of P.J. and Mary Kelley Cain. Graduated from Yale in 1884. Given LL.D. degree by St. John's College in 1903 and University of Pittsburgh in 1912. Taught in evening schools from 1880 to 1884. Professor at St. John's College, Annapolis, Md. 1886 to 1903; Vice president in 1903. Became president of Washington College, Chestertown, Md., in 1903, serving until 1918. Since then Vice President U.S. Fidelity and Guaranty Co. Has written largely upon educational subjects.

CAINE, SIR THOMAS HENRY HALL (1853), Eng. novelist and dramatist; architect and journalist, but turned to novel writing; his works include *The Shadow of a Crime*, 1885; *A Son of Hagar*, 1886; *The Deemster*, 1887; *The Bondman*, 1890; *The Scapegoat*, 1891; *The Manxman*, 1894; *The Christian*, 1897; *The Eternal City*, 1901; *The Prodigal Son*, 1904; *The White Prophet*, 1909; *The Woman Thou gavest me* 1913; several of these dramatized and filmed. Dramas include *The Iron Hand*, 1916, and *The Prime Minister*, 1918. Negotiated terms with Dominion Government regarding copyright; knighted in 1918.

CAIQUE, pointed Turkish skiff used on Bosphorus.

CAIRD, EDWARD (1835-1908), Scot. philosopher and theologian. His bro. John (1820-98) was noted preacher and neo-Hegelian philosopher.

CAIRN, rough chamber composed of unhewn stones, probably always constructed for burial purposes, and in the British Isles and France of Iberian or Celtic origin; sometimes contained dolmens.

CAIRNES, JOHN ELLIOT (1823-75), Irish barrister and writer on political economy; ed. Trinity Coll., Dublin; was successively prof. of Political Economy at Dublin, 1856; Queen's Coll., Galway, 1861; and Univ. Coll., London, 1866; wrote, besides essays, *Character and Logical Method of Political Economy*, 1857; *The Slave Power*, 1862; *Essays in Political Economy, Theoretical and Applied*, 1873; and *Some Leading Principles of Political Economy, newly expounded*, 1874.

CAIRNGORM, ornamental yellow stone, like topaz, found in fine granite of

CAISSON

Caingorm Mts., in Scot. Highlands, and elsewhere.

CAIRNS (16° 54' S., 145° 44' E.); seaport, Trinity Bay, Queensland; minerals, sugar. Pop. 3,600.

CAIRO, cap. Egypt, r. bk. of Nile (30° 2' N., 31° 15' E.), 9 m. from apex of delta; joined by rail with Port Said (147 m.) and with Alexandria (130 m.); 150 mosques—oldest Amr and Ibn Tulun, most beautiful that of Sultan Hassan; magnificent mausoleums, tombs of caliphs, in E. part; mosques containing tombs of the Mamelukes in S. part; univ. El-Azhar 988; see of bishop of Coptic, Greek Orthodox, and R.O. churches; chief public buildings, Abdin palace, citadel, barracks, public works dep., and other government buildings; in Old Cairo is 'granary of Joseph'; two museums—the one containing Egyptian treasures, the other specimens of Arab. art; native city fast disappearing to make way for hotels, offices, and shops; three railway stations, and three bridges across Nile; electric trams and lighting; suburbs contain large and increasing European pop. Inhabitants include Turks, Berbers, Copts, Arabs, Abyssinians, Jews, and Nubians; textiles; founded c. 973; citadel built by Saladin, 1176; seized by Turks, 1517; taken by French, 1798; passed to Turks, 1801; British 1822 to 1923; destructive Nationalist riots, April and May 1919. Pop. 791,000. Poole, *Cairo*. See EGYPT.

CAIRO, a city of Illinois, the county seat of Alexander co. It is situated at the junction of the Ohio and Mississippi Rivers and is on the Illinois Central; the Southern; the Cleveland, Cincinnati, Chicago and St. Louis and other railroads. Cairo is 150 miles S.E. of St. Louis. It is an important trade center for the southern area of Illinois and it has passenger and freight steamer communications with all the river points. During the days of important commercial traffic on the Mississippi, Cairo was one of the most important ports on the river. It is important industrially and has daily and weekly newspapers, banks, etc. Pop. 1920, 15,203.

CAISSON, is a water tight, box-like chamber, constructed of wood or steel or both, on the principle of the diving bell, for use in subaqueous construction work.

In practice the caisson is sunk in the desired position, and compressed air is forced into the chamber until a pressure is reached just sufficient to force the water out. Workmen descend through one or more shafts of such a length that their upper level is above the surface of the water. These shafts are divided into several sections or air locks, by air

tight trap doors. In each successive lock the pressure is increased thereby enabling the men to enter the caisson, in which the air pressure may be considerable, without necessitating a temporary diminution of the pressure. At the same time it subjects the men themselves to a gradual change in pressure, thus preventing the occurrence of the pathological condition popularly known as the 'Bends,' which frequently proves fatal. The shaft serves also as a means of entry for supplies, and of exit for excavated material. As the excavation proceeds, the caisson sinks, either by its own weight or by applied weights, into the depression. With the increase in the depth of the working, the air pressure in the caisson is also increased, so that no water enters the chamber.

CAITHNESS (58° 6' to 58° 38' N., 3° 1' to 3° 53' W.), county in extreme N.E. of Scotland; area, 686 sq. miles; bounded by Pentland Firth, Atlantic, North Sea, Sutherlandshire; surface hilly in S. and W.; highest peaks, Morven, Scaraben; watered by Wick, Forss, Thurso; has extensive moorlands and numerous lochs; chief towns, Wick (capital), Thurso; important fisheries off coast; produces blue flagstones; manufactures tweeds, rope, farm implements, machinery; exports farm produce, whisky, fish. Caithness belonged to Norwegian kings in Middle Ages. Pop. 1921, 28,284.

CAIUS, JOHN (1510-73), Eng. physician; b. Norwich; studied abroad; enlarged and refounded Gonville Hall, Cambridge, now Caius Coll., 1557, and elected master 1559.

CAIVANO (40° 55' N., 14° 19' E.), town, S. Italy; glass. Pop. 11,500.

CAJAMARCA, CAXAMARCA (7° 6' S., 78° 35' W.), city and department, Peru; ancient city of Incas; thermal baths; woolens. Pop. town 12,000; (department) 443,000.

CAJATAMBO, CAXATAMBO (10° 35' S., 77° W.), town (and province), Peru. Pop. province 450,000.

CAJETAN, GAETANUS (1430-1534), cardinal, scholastic theologian; b. Gæta; protagonist of Luther, but believed in reform.

CALABAR (c. 4° 26' N., 7° 13' E.), district, Guinea Coast, Africa, between Kamerun and Niger delta; produces palm oil, rubber, ivory, ebony; extremely unhealthy; includes towns of C., formerly styled Old C., which stands on C. River and has Presbyterian mission, and New C., a port on New C. River.

CALABAR BEAN, seed of *Physostigma*

venenosum; contains alkaloid (*physostigmine*) used medicinally; in tetanus, chorea, and as stimulant for increasing glandular secretion and peristaltic motions of intestine; also as local application for the eye, causing contraction of pupil, relieving ocular paralysis resulting from diphtheria, conjunctivitis of infants, corneal ulcers; formerly used by natives of C. in witchcraft.

CALABASH, the hard shell of the fruit of the C. tree, or bottle-gourd. It is a plant belonging to the genus *Lagenaria* and the order Cucurbitaceae. The common bottle-gourd is a native of India, but the C. tree grows in W. Africa, tropical America, and the W. Indies. The shell of the fruit is extremely hard, and is made by the natives into all kinds of cups, basins, jars, etc., for holding liquids. The plant is a creeping one, and it has white flowers which produce this extraordinary fruit. Sometimes one may see a specimen of C. highly polished and elaborately carved. Of late C. pipes have been extremely popular.

CALABRESELLA, Ital. card game, in which three persons take part, the eights, nines, tens being removed from the ordinary pack.

CALABRIA (39° N., 16° 30' E.), compartment, Italy, area, 5,819 sq. miles; between Tyrrhenian and Ionian Seas; surface mountainous, crossed by Apennines; large forests; grain, rice, fruits, flax; minerals include marble, salt, copper, gypsum; important fisheries; belonged to Rome in III. cent. B.C.; formed part of kingdom of Two Sicilies; long infested by brigands; subject to earthquakes. Pop. 1,470,000.

CALADIUM, genus of leafy tropical plants, suitable for hothouse cultivation.

CALAFAT (43° 59' N., 22° 59' E.), town, on Danube, Rumania; Turks defeated Russians, Jan. 1854. Pop. 7,500.

CALAH, ancient city, Assyria, on peninsula formed by Tigris on W.; now ruins.

CALAHORRA (42° 17' N., 1° 59' W.), town, Logrono, Spain; bp.'s see; grain, tanneries; ancient *Calagurris*. Pop. 10,000.

CALAIS, town, the chief port for passenger traffic between England and the Continent, Pas-de-Calais, France (50° 57' N., 1° 50' E.), 21 m. E.S.E. of Dover; harbor accessible to vessels of largest size; old town on island hemmed in by canal and harbor basins, which cut it off from manufacturing quarter of St. Pierre de Calais; lace and tulle industry,

CALAIS

introduced from Nottingham 1818; fishing center; entered Hanseatic League 1303 captured by Edward III. in 1347 monument to six burghers by Rodin; lost in 1558. During the World War a place of much military and naval activity; frequent objective of Ger. air raids; considerable damage done in 1918. Pop. 73,000.

CALAIS, a city of Maine, the county seat of Washington co. It is a port of entry, on the St. Croix River, opposite St. Stephen, New Brunswick. It is also on the St. Croix, Penobscot and Canadian Pacific Railroad, and is 120 miles E. of Bangor. It is the most northeasterly seaport of the United States and has steamship communication with Boston, Portland, and St. Johns, New Brunswick. It has a large trade in lumber and its other industries include foundries, machine shops, shipyards, etc. There are banks, newspapers, excellent school, a public library, etc. Pop. 1920, 6,084.

CALAMARY. See SQUID.

CALAMIANES (11° 35' N., 119° 55' E.), islands, Philippines; honey, timber. Pop. 18,000.

CALAMINE (ZnCO₃), mineral, zinc carbonate, rhombohedral grey, yellow, or buff-colored crystals; used as a pigment in ceramic painting; name also applied to hydrous zinc silicate or smithsonite.

CALAMITES, extinct plants resembling *Equisetum* (common horse-tail), but enormously larger, (est. height, 90 ft.); flourished during formation of Coal Measures, in which are fossil remains. Common fossil calamite is a cast of the internal or medullary cavity of the stem.

CALAMUS is the generic name of two hundred species of tropical palms native to Asia, Africa, and Australia. Most of these plants are leaf-climbers with long thin stems, and many have hooks growing from the under side which attach themselves to passing objects and prove very troublesome. The stem of *C. Scipionum* supplies Malacca cane, of *C. Rotary*, *C. rudendum*, *C. tenuis*, and *C. verus* rattan-cane, while *C. Draco* yields the 'dragon's-blood' of commerce.

CALAMY, EDMUND, 'THE ELDER' (1600-66), Eng. Presbyterian theologian; member of Westminster Assembly; ejected, 1662; his s. Edmund, 'The Younger,' was f. of Edmund, 1671-1732, Nonconformist historian.

CALANAS (37° N., 6° 54' W.), town, Andalusia, Spain; copper. Pop. 8,300.

CALCITE

CALARASHI (44° 12' N., 27° 15' E.), town, on Danube, Rumania; annual fair. Pop. 11,000.

CALASCIBETTA (37° 33' N., 14° 18' E.), town, Caltanissetta, Sicily; wine, silk, olive oil. Pop. 9,100.

CALASIO (16° N., 120° 15' E.), town, Luzon, Philippine Islands; woven fabrics. Pop. 14,000.

CALATAFIMI (37° 54' N., 12° 51' E.), town, Sicily. Pop. 11,400.

CALTATYUD (41° 25' N., 1° 40' W.), town, Saragossa, Spain. Pop. 11,500.

CALATIA, ancient town, Via Appia, Campania, Italy.

CALATRAVA (38° 40' N., 4° 15' W.), plain, New Castile, Spain. C. la Vieja ruined town and fortress, N.E. of Ciudad Real, Spain.

CALBAYOG (12° 5' N., 124° 40' E.), town, Philippine Islands; hemp. Pop. 16,000.

CALBE, KALBE (52° 39' N., 11° 23' E.), town, on Saale, Prussian Saxony; textiles, paper. Pop. 12,300.

CALCEREA, see SPONGES.

CALCAREOUS ROCK, rock in which lime is predominant; generally of aqueous origin, they are remains of organic life; e.g. corals, foraminifera. C. Soil produced by disintegration of c. rock; difficult of drainage owing to lime retaining water.

CALCEOLARIA, a genus of plants originally from S. America, Mexico, and the West Indies, but now extensively cultivated by gardeners in this country. The order is Scrophulariaceae. There are two kinds of C., the herbaceous and the shrubby. The herbaceous varieties are generally grown from seeds, sown in July in a light soil, composed of sand, leafmould, and loam.

CALCHAS, famous soothsayer at the time of the Trojan War; after encountering Mopsus, who proved his superior in divination, he is said to have destroyed himself.

CALCIFEROUS FORMATION, one of the sub-divisions of Lower Silurian system of N. America; contains c. sandstones, a subdivision of the carboniferous strata.

CALCINATION, CALCINING, process, now called oxidation, of heating various metallic ores in furnaces or heaps for the extraction of metals.

CALCITE, mineral, calcium carbonate

CALCIUM

(CaCO_3) crystallized in hexagonal form; occurs abundantly as limestone, marble, chalk, also as stalactites, talc spar, Iceland spar (purest form), nail-head and dog-tooth spar. C. is decomposed by heat into calcium oxide and carbon dioxide, effervesces when treated with acids, liberating carbon dioxide. Used in glass-working, iron-smelting, preparation of lime, and as building stone.

CALCIUM (Ca. 39.9), metallic chemical element; S.G. 1.58; light yellow lustrous, ductile, and malleable; easily oxidizes in air, burns brilliantly, forming calcium oxide or lime. Decomposes water with liberation of hydrogen. Abundant in nature combined with metallic bases as carbonate, CaCO_3 (limestone, chalk marble), phosphate, $\text{Ca}_3(\text{PO}_4)_2$ (minerals apatite, and phosphorite), fluoride CaF_2 (fluor spar). Occurs dissolved in most natural waters as carbonate or sulphate (calcium phosphate), causing hardness in bones, eggshells (carbonate). Metal is obtained by decomposing calcium chloride by electric current.

CALCIUM LIGHT OR LIME LIGHT. Illumination produced by heating small cylinders of lime (calcium oxide) to a very high temperature. In order to present a new surface to the flame at frequent intervals the cylinders are caused to revolve. The device was first used in 1825 by Thomas Drummond, for signaling purpose, and until recent years it found extensive application in the theatres, in the so-called 'magic lantern,' and for other purposes where an intense illumination is required. The principle of calcium light depends upon the fact that the alkaline earths, of which calcium oxide, or lime, is the commonest, are able to withstand the action of very high temperatures. They can, therefore, be raised to an incandescent temperature without decomposition or disintegration. The heating flame is usually oxy-hydrogen, or a combination of oxygen with coal gas. The oxygen is blown, under pressure, through the axis of the gas-flame, and owing to the rapid and complete oxidation of the combustible gases, an enormous amount of heat is generated. Calcium light is comparatively little used at the present time, the 'limelight' of the theatre being almost invariably an electric lamp of some description. It finds, however, a modern application in the gas-mantle, where a woven cone of alkaline earth is heated to incandescence by a Bunsen burner.

CALCULATING MACHINES. Instruments used to perform arithmetical computations and geometrical

CALCULUS OF VARIATIONS

calculations at an immense saving of time and labor. As the principle on which they are constructed is absolutely accurate, the results are infallible if they are properly operated. The machines that deal with arithmetical calculations have been so far developed that, while most of them are employed for addition, others subtract, multiply, divide and even extract square roots and work problems in the rule of three.

Many ingenious mechanisms have been devised for solving geometrical problems. The slide rule is perhaps the most useful. It has been known in its logarithmic form since 1620, but has been greatly added to and improved. Some varieties work with movable indexes and others with adjacent sliding scales. The slide is set for the problem to be solved and the result is furnished by a 'runner' or may be read from scales on the back. Among devices of demonstrated value may be mentioned the Integrator for solving differential equations; the Planimeter for measuring plane surfaces; the Tide Predictor for tracing in graphic form the movements of the tide at any place for every day of the year to come, and the Hollerith electric tabulating mechanism used by the U.S. Census Bureau, that does the work of hundreds of clerks with a speed and precision that seems uncanny. One of the most ingenious and important of calculating machines is the cash register, which registers the amount purchased and performs other operations. These have come into practically universal use in the United States.

CALCULUS OF VARIATIONS.—Objects of this is to find maxima and minima values of expressions involving integrals, the expressions being supposed to vary by assigning different forms to the functions denoted by the dependent variables. The method of finding such max. and min. values is analogous to that of finding ordinary max. or min. values by the Differential Calculus. Let V denote a given function of $x, y,$

$\frac{dy}{dx} \frac{dz}{dx_2} \dots$ and let $U = \int_{x_0}^{x_1} V dx,$ x_0 and x_1 being given limits. The value of U cannot be found without knowing what particular function y is of x ; but without knowing this we can find δU , the increment of U by ascribing to y an arbitrary increment or variation δy , and from this we can deduce the conditions for a maximum or minimum value of U . The simplest problem to be so treated is to find the shortest line between two points.

Another, first proposed by John

Bernoulli in 1696, which gave rise to the *c. of v.*, is to find the curve of quickest descent from one given point to another. This problem is known as a *brachistochrone*. Another is to find the shape of a solid of revolution experiencing minimum resistance in moving through a fluid, the resistance being assumed to be a normal pressure proportional to the square of the cosine of the angle between the normal to the surface and the direction of motion. Problems of *relative maxima* and *minima* also are dealt with by the variation method; as given the length of a curve, find its form so that the depth of the center of gravity may be a maximum.

CALCUTTA, cap. Bengal, largest city of India (22° 34' N., 88° 22' E.), on l. bk. of Hugli, 85 m. from sea. To S.W. of city proper is Fort William; site of original fort occupied by postoffice; between the Hugli and Chauringhi Road is the Maidan, great open space with race-course. Eden gardens, cricket grounds, and numerous statues of Anglo-Indian notabilities. East of the Maidan is the European quarter, with clubs, hotels, theatres, and private residences; S. E. is St. Paul's Cathedral, and near by the All India Memorial Hall of the Victoria memorial. Government House is a partial copy of Kedleston Hall, Derbyshire. Other important buildings are the town hall (after Ypres), Dalhousie Institute, and Bengal Secretariat and university. Near postoffice is site of Black Hole of Calcutta, in which, after capture of the city by Suraja Dowla, 1756, all but 23 of 146 Brit. prisoners perished of suffocation. To N. extends native city, with narrow, crowded streets. City linked with industrial suburb of Howrah by swing bridges. On r. bank of river are famous botanical gardens. Calcutta monopolizes export trade of Ganges and Brahmaputra valley, and is the great distributing center for imports. Exports jute, tea, hides, skins, oilseeds, grains and pulses, raw cotton, lac, coal, raw silk, saltpetre, and oils. Imports mainly cotton goods, but also metals, sugar, machinery, hardware, etc. Foreign trade, 1914-15, valued at nearly \$425,000,000. Docks extend ten miles; Port Trust progressive and efficient. Industries may be gauged from exports. Monsoon climate; temp. of hot weather averages 85° F. Average rainfall of 60 in. falls in 118 days. Bulk of inhabitants Hindus, but large numbers of Mohammedans. Pop. with suburbs, 1,263,300. Founded by Job Charnock, 1686; attacked and captured by Suraja Dowla, 1756; retaken by Clive, 1757; cap. of India down to 1912, when superseded by Delhi.

CALDECOTT, RANDOLPH (1846-

86), Eng. artist and book-illustrator; attained fame by humorous drawings in Graphic and illustrations to Washington Irving's books, and of nursery stories.

CALDER, SIR ROBERT, BART. (1745-1815), Brit. admiral; b. Elgin, Scotland; defeated Villeneuve, off Finisterre, 1805; Commander of Portsmouth, 1815.

CALDER, WILLIAM M. (1869), American legislator, b. Brooklyn, N. Y. He received his education in the public schools and at Cooper Institute, New York. He engaged extensively in the building and real estate business and constructed nearly three thousand houses in Brooklyn. In 1902-3 he was Brooklyn's Building Commissioner. He was elected as a Republican to the 59th Congress in 1905 and re-elected for four succeeding terms. In 1917 he was chosen U.S. Senator. He was defeated for re-election in 1922 by Dr. Royal S. Copeland. He is a prominent figure in Republican councils, and has been a delegate to three national conventions.

CALDERON DE LA BARCA, PEDRO (1600-81), the greatest of Sp. dramatists; b. Madrid; adopting the profession of arms, saw service in Flanders and elsewhere; wrote plays, and was patronized by Philip IV.; later entered the priesthood, but was eventually recalled to court, and continued his dramatic work for the remaining years of his life. A prolific writer (118 of his plays are still extant), he has been classed by Schlegel with Homer, Dante, and Shakespeare. Eng. trans. include *Six Dramas of Calderon*, by E. Fitzgerald, 1853; *Six Plays of Calderon*, by Denis MacCarthy, 1853; followed by further installments in 1861, 1867, 1870, and 1873; and a fragment of *The Magician* by Shelley; later trans. being those by Norman Maccoll, 1888.

CALDERON, PHILIP HERMOGENES (1833-98), well-known Span. painter; keeper of Royal Academy, 1887.

CALDERON, RODRIGO (d. 1621), Span. adventurer; b. Antwerp; became sec. to Duke of Lerma and subsequently to Philip III., till 1611; cr. Count of Oliva, and in 1614 Marques De Las Siete Indexas; incurred hatred from his indolence. When Uceda's cabal drove Lerma from court, C. was arrested, tortured, and afterwards executed.

CALDERWOOD, DAVID (1575-1650), Scot. divine; banished for resisting attempts of James VI. to establish episcopacy in Scotland; wrote *Alare Damascenum*, a criticism of claims of episcopacy.

CALDERWOOD, HENRY (1830-97), Scot. philosopher; prof. of Moral Philosophy at Edinburgh, 1868; author of *The Philosophy of the Infinite*, 1854, etc.

CALEDON (34° 12' S., 19° 27' E.), town, Cape Province, S. Africa; thermal springs.

CALEDON (29° 30' S., 27° 20' E.), river, S. Africa; rises near Mont aux Sources; flows S.W.; joins Orange River.

CALEDONIA, name given by the Romans to that part of Scotland which was to be the N. of the Roman wall running between the Firths of Forth and Clyde. The name first occurs in Lucan, 64 A.D. It has been the habit of Scott, and other modern poets, to include the Lowlands also under that name.

CALEDONIAN CANAL (57° 5' N. 4° 50' W.), in counties Inverness and Argyll, joining Lochs Dochfour, Ness, Oich, Lochy, and connecting North Sea with Atlantic Ocean; opened 1823; largely used by fishing fleets; favorite tourist route.

CALENDAR. See **CHRONOLOGY**.

CALENDERING, smoothing or glazing of textile fabrics by rollers; the finishing by pressure of linen and cotton goods and paper.

CALENDS. See **KALENDS**.

CALGARY, chief city of S. Alberta, Canada (51° 2' N., 114° 2' W.), on Bow and Elbow rivers, and on C. P. R.; alt. 3,380 ft.; commercial and industrial center of a large dist.; irrigation necessary; progressive and rapidly growing town, with electric cars and lighting; station of Canadian Mounted Police, and of Hudson Bay Co.; ry. workshops, lumber mills, tanneries. Pop. 56,500.

CALHOUN, FRED HARVEY HALL (1874), s. of John Hamilton and Ellen Hall Calhoun. Graduated from University of Chicago, in 1898. Became assistant in geological department of University of Chicago in 1899; at Illinois College in 1902, as assistant professor of geology. Since 1904 professor of geology and mineralogy at Clemson College, S. C. Also acted as assistant geologist to United States Geological Survey. Has taught in the Summer Schools of University of Colorado, University of Chicago, and University of Michigan. Author of many geological monographs to scientific journals and magazines.

CALHOUN, JOHN CALDWELL (1782-1850), Amer. statesman; graduated at Yale, 1804; admitted to bar, and acquired large practice; entered

Congress 1811, and soon became active supporter of the measures which led to the war with Great Britain; was Sec. of War under Pres. Monroe, 1817-25; Vice-Pres. of U.S.A., 1825-32. C. was regarded as the mouthpiece of the Southern States in national affairs, and was a warm advocate of slavery. To his own slaves he was the most indulgent of masters. C. also held the State's right of nullification, (i.e.) preventing operation of a Federal law. His integrity of character and kindness of disposition secured to him a large following of personal friends.

CALI (3° 25' N., 76° 45' W.); town, Colombia, S. America; commercial center. Pop. 46,000.

CALIBRATION, the process of ascertaining the place and amount of variation in a scientific instrument. If the bore of a thermometer tube varies in width, variation in bore will introduce an error. The process is also applied to burettes used in chemical analysis, stretched wires used in potentiometers and arrangements such as the Wheatstone Bridge, sets of weights used for balances of high accuracy, spectroscopes used for determination of length of light-waves, galvanometers intended to give the absolute measure of a current, etc.

CALICO, grey or bleached cotton cloth; c., when printed upon, is known technically as 'print'; name derived from town of Calicut (Madras), where cotton cloths were made, XVI. cent.

CALICO PRINTING. See **COTTON**.

CALICUT (11° 15' N., 75° 49' E.), seaport town, Madras, Brit. India; first Ind. port visited by Europeans; anciently a flourishing city and trade center; gave name to calico, a former important manufacture; ceded to British, 1792; chief exports, coffee, spices, and timber. Pop. 80,000.

CALIFORNIA, state, U.S., on Pacific coast (32° 30'-42° N., 114° 6'-124° 30' W.); bounded N. by Oregon, E. by Nevada, Arizona, S. by Mexico, and W. by Pacific. Surface generally consists of two great mountain systems running lengthwise through the state, with a broad valley between them. These mts. are the Sierra Nevada in the E. and the Coast Range along the coast; chief peaks of former, Mt. Whitney, Fisherman Peak; of latter, San Bernardino, San Jacinto. In the S. is the Tehachapi range, uniting the two great systems. The central valley is remarkable for beauty, and is called the Great Valley of California; it is over 500 m. long and from 40 to 60 m. wide. It is drained by the Sacramento and the San Joaquin,

which flow respectively through the N. and S., and, uniting in lat. 38° 3' N., enter Suisun Bay to N. of San Francisco. The famous Yosemite Valley breaks through the E. branch of the Sierra Nevada. Chief lakes are Tulare, Owens, Mono, Tahoe, Honey, Goose, Klamath. In the S. are depressed desert regions. Chief towns are San Francisco, Los Angeles, Oakland, Sacramento (cap.), San Diego, Pasadena, San José, Alameda. Climate is cold and wet in N., but in S. dry and semi-tropical.

Flora includes redwood and mammoth trees, wild oats, alfalfa, and great variety of flowering shrubs. Fauna includes grizzly bears, pumas, wolves, deer, lizards, woodpeckers, quails.

Resources.—Gold is extensively mined; quicksilver, lead, silver, copper, iron, antimony, chromium are found in considerable quantities, as well as rock salt, borax, asphalt, soda, sulphur, and china clay; petroleum abounds, but there is little coal. Agricultural wealth is remarkable, though in places irrigation is necessary; wheat and barley extensively cultivated; grapes (wine-making likely to be discontinued owing to prohibition), oranges, lemons, olives, citrons, peaches, pears, cherries, apricots, and other fruits largely produced; sugar-beet, cotton, tobacco, hops also cultivated. There are immense forests with fir, cedar, pine, and other trees; and lumbering is an important industry. Sheep and cattle raised; ostrich farming carried on; silk produced; fisheries important. Industries include canning of fruits and vegetables, meat packing, flour milling, brewing, dairying, distilling, shipbuilding, tanning; exports, fresh, dried, and canned fruit, cereals, timber, wool, sugar, mineral products, petroleum, tobacco. California is connected with eastern states by four railways; mileage, 9,440.

Inhabitants include persons of Brit., Ger., Canadian, Ital., Fr., and Swed. extraction; there are also Chin., Jap., Ind., and negro inhabitants; but 75 per cent. of pop. is Amer. by birth. Area, 158,297 sq. m., 2,645 sq. m., being water; pop. 3,119,400.

Executive is in hands of governor, assisted by lieutenant-governor and five ministers; legislative power vested in senate of 40 members and assembly of 80 members, former elected for four, latter for two years. California has woman suffrage. The state sends 2 senators and 11 representatives to Congress.

Education is free and obligatory. The Univ. of California superseded Coll. of California; established at Oakland 1869, having obtained charter 1868; removed to present site, Berkeley, 1873;

fine situation by San Francisco Bay, with large grounds on slopes of Berkeley Hills; handsome buildings raised; besides colleges at Berkeley Univ., now includes Lick astronomical department near San José, art department, formerly 'Mark Hopkins Institute of Art', in San Francisco, univ. farm at Davisville, botanical laboratory at Whittier, biological laboratory at La Jolla, and other branches; noted library. The Leland Stanford Junior Univ. at Palo Alto is also famous.

CALIFORNIA, GULF OF, OR SEA OF CORTES, an arm of the Pacific Ocean, separating Lower California from the mainland of Mexico. Its length is about 700 miles and its width varies from 40 to 100 miles. Cortes discovered the gulf. The northern extremity receives the river Colorado. The chief ports are San José, San Felipe and La Paz on the western, and Mazatlan and Guaymas on the eastern shore.

CALIFORNIA, LOWER (30° N., 109° 53' W.), peninsula, territory of Mexico, between Gulf of California and Pacific Ocean; mountainous; water and vegetation scarce, but valleys produce maize and wheat; horses and cattle reared; Spaniards settled here in XVII. cent.; gold and silver mining and pearl-oyster fishing. Pop. 55,000.

CALIFORNIA, UNIVERSITY OF, a coeducational, non-sectarian institution of higher learning, at Berkeley, Cal., founded in 1860. Its productive funds are about \$6,500,000. The annual income amounts to almost \$7,000,000, the larger part of which is supplied by the state. Tuition is free. For the year 1922 the University reported 14,367 students and 1,024 teachers, exclusive of extension courses and summer sessions which are taken by over 30,000 students. President, David Prescott Barrows, Ph.D.

CALIGULA, CAIUS CÆSAR AUGUSTUS GERMANICUS (A.D. 37-41), was born at Actium in the year A.D. 12, the s. of Germanicus and Agrippina. He was brought up among the soldiers at the camp, and thus became their great favorite, receiving from them the nickname of C., from the soldier's boots (*caligulae*) he used to wear. He was adopted as his grandson by Tiberius, and on the death of that monarch in A.D. 37 it was found that the empress was left to C. and the true grandson of Tiberius. C.'s appointment was hailed with enthusiasm, and the senate and people soon gave him sole power. For a time he gave no sign of carrying out Tiberius's prophecy that he was educated 'for the destruction of the Roman

people.' He removed taxes, and scattered rewards and indemnities liberally. Then came an illness induced by his evil life, and on recovery from this he seemed possessed by a fury. He slaughtered his own relatives, and filled Rome with blood. His extortions, prodigality, and cruelty were unspeakable. Finally the citizens decided to rid themselves of the tyrant, and he was assassinated.

CALIPH, name given to successors of Mohammed. The story of the Mohammedan chiefs who bore the name of caliph falls into three dynasties: (1) The four caliphs who severally succ. Mohammed; (2) the Omayyad caliphs; (3) the Abbasid caliphs.

Mohammed, dying without male issue, was succ., 632 A.D., by Abu-Bekr (q.v.), f. of Ayesha, the prophet's wife; at his death, 634, he nominated Omar, another relative, as his successor; Omar was stabbed by a slave, 644, and a select council app. Othman, a high official, as third caliph, who was in turn succ. by Ali, s. of Abu Taleb, murdered by a fanatic in 661.

The reign of each of these four rulers had been largely occupied with warfare, and before the death of Ali a new competitor for the caliphate had entered the field in the person of Moawiya, gov. of Syria, who claimed to succeed his cousin Othman, and, having subdued Persia, Syria, Egypt, and Yeman, deposed Ali's s., Hassan, and seized the caliphate.

Omayyad Caliphs.—Moawiya (661-80), who made the title of caliph hereditary, was the first ruler of the line of Omayyads, and their capital was Damascus. This dynasty lasted until 750, when it was in turn overthrown by a powerful family, Abbasides, descended from Abbas, uncle of Mohammed.

Abbasid Dynasty.—Abûl Abbas (750-54), the first caliph of the line, was followed by his bro., Abu Jaafar Almansôr, 754-75, who established the seat of Empire at Bagdad; succ. by his s., Almahdi, 75-85; Alhadi 785-86; followed in turn by Harun or Raschid, 'the Just' 786-809. Of all these potentates by far the most famous is the last mentioned, whose name has been made familiar throughout the world by means of the *Thousand and One Nights*.

CALIPPIC PERIOD, three Metonic cycles of 6,940 days each and 6,939 days in addition; suggested by astronomer Calippus; coincides with six Julian years.

CALISTHENICS, See GYMNASTICS.

CALIVER, XVI.-cent. firearm.

CALIXTUS, name of three popes: Calixtus I. 217-22, said to have been a slave originally.—Calixtus II. 1119-24, a noble Burgundian, chosen Pope at Cluny, and displaced the Anti-Pope, Gregory VIII.—Calixtus III. 1455-58, a Spaniard, Alphonso de Borgia, owed his advancement in the Church to Alfonso V. of Aragon.

CALIXTUS, GEORG, CALLISEN (1586-1656), Ger. theologian; sought to broaden basis of Lutheranism.

CALKINS, FRANKLIN WELLES (1857), s. of John Franklin and Abigail Welles Calkins. Practiced law and ranched in California. Was one of the early explorers of the Black Hills Country and early became familiar with many of the Indian tongues. Is a naturalist and lover of the open. For years has written of the Far West and for nearly forty years a constant contributor to *Youth's Companion* and other magazines. His stories of life on the plains are published in more permanent form in such books as *Up the Missouri; Captured by the Crows, The Cougar Tamer*, 1899; *My Host the Enemy*, 1901; *Two Wilderness Voyagers*, 1903; *The Wooing of the Tokala*.

CALKINS, RAYMOND (1869), s. of Wolcott and Charlotte Whitton Calkins. Graduated at Harvard in 1890 and from Harvard Divinity School in 1905, ordained in Congregational Ministry in 1896. Held pastorates in churches in Pittsfield, Mass., and Portland, Me. Since 1912 pastor of First Congregational Church in Cambridge, Mass. Author, *Substitutes for the Saloon*. Co-editor, *Hymns for the Church*, 1912; and the *Social Message of the Book of Revelations*, 1912.

CALLA, a genus of Araceæ with the single species, *C. palustris*, bog arum, found in marshes of N. Europe. The leaves are cordate, not sagittate, and the hermaphrodite flowers, borne every two years, are enveloped in a beautiful white spathe. *Richardia adhiopica*, the Egyptian lily, or lily of the Nile, was formerly included in this genus.

CALLAGHAN, SIR GEORGE (1852), Brit. admiral; commanded naval brigade for relief of Peking, 1900; commander-in-chief of home fleet, 1911-14; commander-in-chief at Nore, 1914. In 1917 became one of the five admirals of the fleet. Appointed Bath King of Arms, 1919.

CALLAN, ROBERT EMMET (1874). Graduated at United States Military Academy, West Point, in 1896. Commissioned additional 2nd Lieutenant of artillery in June, 1896. Promoted

through the various ranks reaching grade of brigadier-general in 1921. Participated in campaigns in Porto Rico in 1898. In command of 65th Heavy Artillery at breaking out of World War and took that regiment to France in 1918. Served as Chief of Staff of Army Artillery, 1st Army in August, 1918. Commanded Heavy Artillery Brigade from August to December, 1918. Member of various army missions in Europe, in 1919.

CALLAO (12° S., 77° 15' W.), chief seaport of Peru; fine harbor; exports guano, chemicals, coffee, rice, cocaine, wool, salt, sugar, hides, tobacco; imports coal, machinery, flour, wheat, rice, etc. Old town was destroyed by earthquake, 1746. Notable buildings are old fortress (now customs house) and prefecture. Pop. 48,000.

CALLCOTT, SIR AUGUSTUS WALL (1779-1844), Eng. artist; famed for landscapes; R.A., 1810; knighted, 1827.

CALLCOTT, JOHN WALL (1766-1821), Eng. composer and musician; won reputation as composer of glees; his *Musical Grammar*, 1806, was long regarded as a standard work.

CALLIAS, tyrant of Chalcis; friend of Demosthenes.

CALLIAS AND HIPPONICUS, heads of an Athenian family who were hereditary torch-bearers at the Eleusian mysteries.

CALLIMACHUS (fl. 250 B.C.), Gk. poet; wrote large number of poems, his elegies being especially esteemed; app. librarian of Alexandrian library by Ptolemy Philadelphus.

CALLINUS (630-560 B.C.), earliest Gk. elegiac poet.

CALLIOPE, Muse of Epic poetry.

CALLIRHOE (classical myth.), dau. of god Achelous; wife of Alcmæon.

CALLISTHENES (IV. cent. B.C.), Gk. historian; pupil of Aristotle; accompanied Alexander the Great into Asia, and wrote an account of the expedition; also histories of the wars of the period.

CALLISTO (classical myth.), a nymph; dau. of Lycaon; with her son, Arcas, transformed into a constellation.

CALLISTRATUS, name of (1) Gram-marian (fl. II. cent. B.C.); (2) Athenian poet; (3) Gk. rhetorician (fl. c. III. cent.).

CALLOT, JACQUES (1592-1635), Fr. engraver; b. Nancy; left home at age of twelve to pursue his studies in Italy;

patronized by Cosimo II. of Florence; executed designs for Louis XIII. of France, and other crowned heads.

CALLOVIAN, lowest section of Oxford Oolite rocks, called also Kellaway Rock, a calcareous sandstone with characteristic fossils (*Ammonites callovienenses*).

CALMET, ANTOINE AUGUSTIN (1672-1757), Fr. Benedictine; wrote numerous commentaries on the Bible.

CALMETTE, GASTON (1858-1914); Fr. journalist, b. Montpellier. In March, 1914, while he was editor of the *Paris Figaro* and engaged in a very bitter political controversy with Joseph Caillaux (q.v.), then Minister of Finance and at one time Premier, he threatened to publish some private correspondence of Mme. Caillaux which he had secured. The latter, having learned of this plan, called upon Calmette at his office and shot him dead. Caillaux thereupon resigned from the cabinet. Mme. Caillaux was arrested immediately, but her sensational trial for murder resulted in acquittal.

CALOMARDE, FRANCISCO TADEO, DUKE (1775-1842), Span. statesman who encouraged illiberal policy of Ferdinand VII.; supported Carlists.

CALOMEL (mercurous chloride); Hg₂Cl₂, found naturally as the mineral called horn-quicksilver, or prepared from a mixture of mercury and corrosive sublimate; a yellowish-white crystalline powder, heavy, and tasteless; used in med. as a purgative, being antiseptic and a bile stimulant.

CALONNE, CHARLES ALEXANDRE DE (1734-1902), Fr. statesman; after filling various legal appointments under Crown, was summoned, 1783, to take charge of national finances, and endeavor to replenish royal treasury; met with ill success, and was dismissed and exiled by Louis XVI., 1787; returned to France, 1802, by permission of Napoleon.

CALORESENCE, term describing the optical phenomenon that, when invisible heat rays are focused by a lens upon charcoal, the latter is heated to incandescence, the heat rays being converted into visible rays.

CALORIE. The unit by which heat is measured. The 'small calorie' is the amount of heat required to raise 1 gram of water 1°C. The 'great calorie' is the amount of heat required to raise 1 kilogram of water 1°C. and is therefore equal to 1,000 small calories. It is also approximately equal to the heat required to raise 1 lb. of water 4° F. and is therefore approximately equal to 4 B.T.U's, the factor generally used being

3.968. The 'mean calorie' is obtained by dividing the amount of heat required to raise 1 gram of water from 0° to 100° C. by one hundred. It is not necessarily the same as that required to raise 1 gram of water 1° C. because the specific heat of water varies slightly with its temperature.

CALORIES (food). Owing to the fact that the changes which food undergoes in the body are due to oxidation, the amount of heat liberated by any food when it is burnt is an approximate measure of the amount of energy it will yield when eaten. The large calorie (see CALORIM) is therefore taken as a unit of nutriment, and by burning a weighed amount of food in a calorimeter the number of calories, or, in other words, the amount of nutriment, it will yield may be readily determined. It should be noted, however, that the results thus obtained are not a *complete* indication of food-value. Thus a pound of butter will yield almost six times as many calories as a pound of beef, but one could not live on butter alone because it contains only a negligible quantity of protein, in which constituent beef is very rich, and protein is necessary in order to repair the daily wear and tear of the tissues, and, therefore, to maintain life. The calorie, however, is the only absolute standard by which foods can be compared, and it is therefore of great value if used intelligently. The number of calories needed daily by the adult varies from fifteen to twenty per pound of normal weight. The greater the physical activity, the greater the number of calories required.

CALORIMETER, an instrument for measuring the quantity of heat, given off or absorbed by a body as a result of changes in its temperature or other conditions, such as the consumption of food in the case of human beings or animals. There are also ice-calorimeters for measuring negative heat, (*i.e.*) cold.

CALOTTE (Fr.), cap worn over priestly tonsure, hence symbol of priest; Fr. association formed by men of high rank in XVII. cent. for merciless criticism of society, and named from the *c.*, which they sent to objects of their criticism as symbolic covering for their exposed faults.

CALPE (36° 9' N., 5° 21' W.), promontory, Spain; now called Gibraltar (*q.v.*).

CALPURNIA, childless wife of Julius Cæsar; tradition records her pleading with Cæsar not to go abroad on fatal Ides of March.

CALPURNIUS, TITUS, Rom. poet;

wrote eclogues in manner of Theocritus; lived about time of Nero

CALTAGIRONE (37° 12' N., 14° 33' E.), city, Catania, Sicily; bp.'s see; manufactures pottery. Pop. 50,000.

CALTANISSETTA (37° 27' N., 14° 2' E.), town, Sicily; cathedral; is center of sulphur industry; has mineral springs. Pop. 45,000.

CALTROP, small iron ball fitted with sharp spikes; strewn on ground before opposing force in battle to check cavalry charge.

CALUIRE-ET-CUIRE (45° 48' N., 4° 52' E.), town, on Saône, France; perfume and pottery. Pop. 11,000.

CALUMBA ROOT, or *Radix Calumba*, is obtained from the climbing herbaceous plant, *Jateorhiza palmata*, a species of Menispermaceæ occurring in tropical Africa. The odor is faintly aromatic, the taste bitter and slightly acid, and the bitter active principle is known as calumbine. It is used medicinally as a tonic and stomachic.

CALUMET, Fr. name for 'peace-pipe' of Amer. Indians; its being offered to strangers was signal mark of hospitality.

CALUMET, a city of Michigan, in Houghton co. It is on the Mineral Range and other railroads. It is notable for being the location of the famous Calumet and Hecla copper mines which is one of the largest producers of copper in the history of copper mining. Calumet is the trade center for the Lake Superior mining region. It has banks, newspapers, and important industries. Pop. 1920, 40,000.

CALUMPIT (14° 48' N., 120° 50' W.), town, Luzon, Philippine Islands; important market; chief product is rice. Pop. 15,000.

CALVADOS (49° 5' N., 0° 20' W.), maritime department, N.W. France; principal rivers are Touques, Dives, Orne, and Vire; soil generally fertile, and provides pasturage for the cattle and horses raised; butter, cheese, and cider produced; textiles manufactured; fisheries productive; iron, coal, and granite found; capital, Caen; area, 2,197 sq. miles. Pop. 400,000.

CALVAERT, DENIS, DIONISIO FIAMMINGO (d. 1619), Dutch painter; master of Domenichino.

CALVARY ('place of skulls'), place where Christ was crucified; 'a Calvary,' representation of Crucifixion.

CALVÉ, EMMA (1864), (Emma de Roquer), Fr. *prima donna* (soprano);

first public appearance 1882, in Gounod's *Faust* (Brussels); sang in *Cavalleria Rusticana*, 1892; Massenet's *Sapho*, 1897; composed for her; most brilliant success was in *Carmen*.

CALVERLEY, CHARLES STUART (1833-84), Eng. poet and scholar; brilliant univ. career both at Oxford and Cambridge; pub. *Verses and Translations*, 1862; *Verse Translation of Theocritus*, 1869; *Fly-Leaves*, 1872. As a writer of light verses and parodies he is unsurpassed.

CALVERT, GEORGE, see BALTIMORE.

CALVERT, SIR HARRY, Bart. (d. 1826), Eng. general; served under Cornwallis in Amer. War; adjutant-general 1799; received baronetcy, 1818.

CALVERT, PHILIP POWELL (1871), educated at public schools in Philadelphia. Studied at University of Pennsylvania in 1889 and from 1891 to 1895. Given Ph.D. degree in 1895 and also from Berlin and Jena in 1895-1896. Attached University of Pennsylvania since 1897 as instructor, assistant professor and professor of Zoology. Editor of *Entomological News*, since 1911. Member of a number of scientific societies both in the United States and abroad. Has contributed largely to scientific journals and magazines. Author, with Amelia S. Calvert: *A Year of Costa Rica Natural History*, 1917.

CALVES' HEAD CLUB, formed shortly after his execution to deride the memory of Charles I.; existed until 1734.

CALVI (42° 34' N., 8° 44' E.), fortified seaport, Gulf of Calvi, Corsica; captured by British, 1794; retaken by Corsicans, 1795.

CALVIN, JOHN (1509-64), Prot. Reformer; b. Noyon, Picardy. Destined for the R.C. Church, he was appointed, 1521, to a chaplaincy in the cathedral of his native town. Later he continued his education in Paris, achieving brilliant success in his grammatical and philosophical studies. In 1527 he received curacy of St.-Martin-de-Marteville, and later that of Pont-l'Évêque, near Noyon. A year later Calvin decided to withdraw himself from the Church, and went to study law at Orléans and later at Bourges. Here also he began to study Greek under Melchior Wolmar, and first imbibed the doctrines of the Reformation. In 1531 he was again in Paris, where, in support of the 'new religion,' he pub. his first book—a Latin commentary on Seneca's *De Clementia*, 1532.

Before long, the persecution of the Protestants began, and he had to flee

to Basel, where he produced his *Institutes of the Christian Religion*, 1536. At twenty-five he had sacrificed all other interests for the Reformed faith, and his influence became very great. In 1536 he moved to Geneva, where he was followed by his chief supporters, and here they issued a Prot. Confession of Faith, through the influence of which a strict morality took the place of loose living. Within two years, however, owing to a reaction against his severe rule, Calvin had to take refuge in Strasbourg, where he was appointed pastor of a church and prof. of theol. In 1540 he attended the Diet of Worms, and in 1541 that of Ratisbon, where he was introduced to Melanchthon. He returned to Geneva, 1541, where, except for a brief interval, he lived for the rest of his life.

Through Calvin's influence now increased year by year, he was continually engaged in fierce controversies with enemies of the new faith, one of the most notable being that with regard to election and predestination with Albert Pighius. Calvinism, in the extreme form which it assumed in the 17th cent., has long been losing ground both in Scotland and in England. Quatercentenary celebrated in 1909.

CALVISIUS, SETHUS (1556-1615), Ger. chronologist; pub. *Opus Chronologicum*, Leipzig, 1605.

CALVO, CARLOS (1824-1906), Argentine historian; wrote number of books relating to history of the South Amer. republics; Minister at Berlin, 1885.

CALYDON, ancient town, Ætolia; legendary scene of hunting of Calydonian boar.

CALYDONIAN BOAR. In Gk. myth. Calydon, capital of Ætolia, was wasted by boar sent by Artemis in revenge for sacrifice omitted by King Æneus; in one story, adopted by Swinburne, Atalanta (q.v.) took chief part in the chase.

CALYPSO (classical myth.), *Daus* of Oceanus; Odysseus, when shipwrecked on Ogygia, of which she was queen, stayed there seven years.

CALYX. See FLOWER.

CAM, contrivance, generally a projecting part of a wheel, for converting rotary into rectilinear motion; used in petrol and gas engines to open inlet and exhaust valves.

CAM (52° 5' N., 0° 10' E.), river, Cambridgeshire, England; joins Ouse.

CAM, DIOGO, CÃO, Portug. traveler; first European to explore the Congo c. 1482.

CAMACHO

CAMACHO, JUAN FRANCISCO (1824-96), Span. statesman; his drastic financial reforms made him unpopular.

CAMAGÜEY (21° 23' N., 77° 56' W.), city and province, both formerly Puerto Principe, Cuba. Pop. 98,000; province 230,000.

CAMALDOLESE, CAMALDULIANS, order of Eremitic monks, founded by St. Romuald, c. 950, at Camaldoli, in the Apennines. The monks, who wear a white habit, dwell in separate huts, and only meet together for divine service and for meals. C. monasteries still exist in Italy.

CAMARACUM, see **CAMBRAI**.

CAMARGO, MARIE ANNE (1710-70), Fr. ballet-dancer; made her début in Paris, 1726, and took the public by storm; portrait in Wallace Collection.

CAMARGUE (43° 20' N., 4° 41' E.), island, Bouches-du-Rhône, S.E. France; region marshy and unhealthy.

CAMARILLA, body of unofficial councillors of sovereign; especially clique which swayed Ferdinand VII. of Spain, 1814-20.

CAMARINA, ancient town, S. coast of Sicily; founded from Syracuse, 599 B.C.; complete destruction dates from A.D. 853.

CAMBACERES, JEAN JACQUES RÉGIS DE, DUKE OF PARMA (1753-1824), Fr. statesman; leaned to side of mercy at trial of Louis XVI.; member of Committee of General Defense, 1793; pres. of Committee of Public Safety, 1795; Second Consul, 1799; later made Arch-Chancellor of France.

CAMBALUC, old name of city of Peking, meaning 'City of the Emperor'; was for a short period an abb.'s see; sometimes spelt 'Cambalu'; thus Longfellow writes of 'the Golden City of Cambalu.'

CAMBAY (22° 18' N., 72° 30' E.), seaport, capital of small native state of C., Bombay, India, on Gulf of O.; formerly important commercial city; commerce fallen away owing to harbor silting; famed for manufacture of agate and carnelian ornaments. Pop. 35,000.

CAMBAY, GULF OF (22° N., 72° E.), inlet W. coast Brit. India; rapid tides; sandbanks.

CAMBERWELL, metropolitan and parl. bor., S.E. London; chiefly residential; includes Dulwich; S. London Fine Art Gallery; large parks. See **LONDON**.

CAMBERT, ROBERT (1628-77), Fr. musician; bandmaster to Charles II. of

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England, 1673; his opera, *Pomone*, was produced in London.

CAMBIASI, LUCA (1527-85), Genoese artist; accepted commission from Philip II. of Spain to paint series of frescoes in the Escorial.

CAMBODIA, CAMBODGE (12° N., 105° E.), Fr. protectorate, S.E. Asia, bordering on Gulf of Siam; area, 57,900 sq. miles. Surface generally is alluvial plain of Mekong R., with mountain ranges and detached peaks in N.E. and W.; one arm of Mekong flows to Tonle Sap, great lake in C. and Siam, subject to extraordinary fluctuations. Chief towns are Pnom-Penh, Kampot. Climate is warm, subject to monsoons; some districts malarial. C. produces rice, sugar-cane, betel, tobacco, indigo, pepper, maize, cinnamon, coffee, cotton, vanilla, mulberry, cacao. Industries include manufactures of silk, pottery, bricks, matting; cattle raised.

C. is ruled by native king under Fr. protection. Inhabitants include Khmers, Chinese, Annamese, Malays, and there are some uncivilized mountain tribes; chief religion, Buddhism. C. was powerful state under Khmers, attaining zenith in early mediæval period; various ruins remain of former greatness; Fr. protectorate formally established, 1867. Pop. 1919, 2,000,000.

CAMBON, JULES MARTIN (1845), Fr. diplomat; gov.-gen. of Algeria, 1891; ambassador at Washington, 1897; Madrid, 1902; and at Berlin when World War broke out; arranged Morocco agreement of 1909 and 1911. In the Fr. Yellow Book he gave a searching analysis of relations between France and Germany during two or three years preceding the war, and remarked on the psychological change in the Kaiser, who, jealous of his son's popularity, went over to the war party. His interview with Herr von Jagow, July 24, 1914, assured him that Germany was banking on the passivity of Russia in backing Austria against Serbia. Largely due to him that France was prepared when the storm broke. In 1915 general secretary at Fr. Foreign Office; attended Allied conference at Paris, Dec. 1915.

CAMBON, PIERRE JOSEPH (1756-1820), Fr. financier and statesman; was member of Legislative Assembly, 1791, and of the Convention, 1792. During Revolution proposed to prepare a 'grand livre' of national debt. This plea was set forth in his *Rapport sur la Dette Publique*, 1793. In finance he was now supreme, but his independence, his hatred of dictatorship, and protests against excesses of Revolutionary Tribunal

incurred hatred of Robespierre; at restoration he was exiled, and died in Belgium.

CAMBON, PIERRE PAUL (1843), Fr. diplomat; ambassador at Madrid, 1886; Constantinople, 1890; and London since 1898. Received from Sir Edward Grey assurance that if Ger. fleet undertook hostile operations against the Fr. coast, the Brit. fleet would afford protection. Did much to cement the *entente* between France and Great Britain.

CAMBORNE (50° 13' N., 5° 18' W.), market town, Cornwall, England; tin and copper mines. Pop. 15,000.

CAMBRAI (Rom. *Camaracum*), tn., Nord, France (50° 10' N., 3° 12' E.), on r. bk. of Scheldt; important junction on main line of Northern Ry.; linen fabrics, cambrics, also copper working, brewing, distilling, tanning, and soap; seat of archbishop; cathedral of Notre Dame with tombs of Fénelon and Dubois, former archbishops. League of Cambrai formed here 1508. On retreat from Mons British fought delaying battle between town and Le Cateau, Aug. 25-6, 1914; town taken by Germans; an important center of roads and railways, it became natural base of supplies for the Siegfried line. In Nov. 1917 heavy fighting to the W. during first battle of Cambrai (see below). In final Allied advance the line Cambrai-St. Quentin was of vital importance to the Germans, who defended it desperately; defenses broken Sept. 27-9, 1918; entered by Canadian troops and 57th Division night of Oct. 8-9; badly damaged by retreating enemy; is to be rebuilt by Algiers. Pop. 15,000.

Battle of Cambrai (Nov. 20-Dec. 7, 1917).—While Italy was struggling on the Piave and Ger. troops were being moved W. from Russia, Sir Douglas Haig decided to strike in direction of Cambrai while main Ger. forces were concentrating in Flanders. Battle that followed famous for large use made of Tanks with cavalry support; fought by Byng's 3rd Army between Bapaume-Cambrai road and Scheldt Canal, near Banteux; object to pierce defenses of Siegfried system of Nord and Scheldt canals for 5 or 6 m. Bourlon Wood, commanding position overlooking W. approaches to Cambrai, was to be surprised, also Marquion, where Arras and Cambrai road and railway cross Nord Canal amidst marshes; cavalry then to break through, but capture of Cambrai no part of original scheme. Tanks concealed in Havrincourt Wood. Battle began 6:20 A.M. on Nov. 20; 180 tanks went forward, followed by infantry and

1st, 2nd, 4th and 5th Cavalry Divisions. Main Siegfried lines carried; advance made of 4½ m. Delay at Flesquières and Masnières allowed enemy to send reinforcements, and cavalry did not break through. Flesquières captured following day, and British reached outskirts of Mœuvres and Bourlon Wood; all efforts against Rumilly and Crèvecœur fruitless; original plan had failed, but action continued as infantry battle; reinforcements sent up. Bourlon village and Fontaine-Notre-Dame taken and retaken; towards end of month signs of Ger. counter-attack in strength; Nov. 30, the enemy struck with sixteen fresh divisions, and large part of Brit. line overwhelmed; Germans employing their new "infiltration" tactics; 29th Division at Gonneaucourt made gallant stand, and Guards Division recovered place; continuous line re-formed; Germans made no further headway. Battle served to divert Ger. troops from Italy. British gained 16 sq. m., including 7 m. of the Siegfried system.

Battle of Cambria-St. Quentin, Sept. 27-Oct. 5, 1918, marked fourth stage of final offensive that helped to end the World War. By Sept. 26 British were again facing portion of Hindenburg system, which Germans had fortified with every known device as their main defense in France. Attack on Cambrai-St. Quentin front part of series of converging offensives from Meuse valley to Flanders. Morning of Sept. 27 right wing of Horne's 1st Army and Byng's 3rd Army opened the attack. In front stretched the Nord Canal, with marshes on either side, and on the far side wide belts of wire commanded by numberless machine guns on the high ridges crossed by Quesnoy Wood and the village of Oisy-le-Verger; Germans held high ground across the Sensée marshes, N. flank of Brit. position. This was captured by 11th Division, which, after crossing canal, spread out fanwise and carried Oisy-le-Verger and Quesnoy Wood from reverse side. Canadians also crossed, and near Bourlon joined hands with other divisions. Siegfried line carried along the whole front attack; 10,000 prisoners and 200 guns; British now close to Scheldt Canal at Marcoing; this crossed, and only part of Ger. defenses now resisting were from Vendhuille to Holnon, with the Scheldt Canal stretching across front, not only difficult obstacle, but a safe shelter for enemy reserves. This section, after most desperate fighting, carried; advance was continued next day, compelling general retreat of enemy behind the Scheldt Canal. On Oct. 1 the French entered St. Quentin. Four more days of ceaseless fighting ensued, in which British,

Australians, Canadians, New Zealanders, Americans, and French in turn won distinction. On Oct. 5 the final line of the 'impregnable' Siegfried system fell; Cambrial had been outflanked, and was entered, night of Oct. 8-9, by Canadian troops of the 1st Army from the N.W., and by the 57th Division of the 3rd Army from the S.

CAMBRIA, ancient Lat. name of Wales, county of Cymrl.

CAMBRIAN SYSTEM, term applied to the earliest fossiliferous geological system overlying the Archaean or Pre-Cambrian system, the oldest of the Geological Record, and overlaid by the Silurian system. It derives its name from Cambria (i.e. Wales), where it is specially well developed, attaining in places a thickness of 12,000 ft. Outcrops also occur in Shropshire, Warwickshire, Malvern Hills, Cumberland, eastern Ireland, and north-western Scotland. It is met throughout Europe at intervals from Scandinavia to Bohemia, and occupies vast areas of eastern North America. The Cambrian rocks consist of grits, sandstones, greywackes, quartzites, and conglomerates, with thick groups of shales and slates. In Scotland limestones are prevalent, and in America limestones, greensands, and dolomites, with masses of volcanic rocks.

Fossils are numerous and, although the earliest discovered forms of life, they show an advanced development pointing to still lower, lost, or undiscovered ancestors. The most characteristic fossils are the Trilobites (Crustacea), Paradoxides, Olenus and Olenellus, and the Brachiopod *Lingula Davisii*, from the Port Madoc slates. The only discovered plants are regarded as Algae (Eophyton). The system in Britain is subdivided as follows:—

Upper	{ Tremadoc slates
	{ Lingula flags (Olenus zone)
Lower	{ Menevian series (Paradoxides)
	{ Harlech series (Olenellus zone)

CAMBRIC, fine cloth first manufactured at Cambral, France.

CAMBRIDGE, town, Cambridgeshire, England, and Cam (52° 12' N., 0° 7' E.). Famous as univ. town. Cambridge Univ. is said to have been founded or restored by Siebert of East Anglia and revived by Edward the Elder; became important early in 13th cent.; obtained papal recognition in 1231. Colleges, in order of foundation, are: (1) *Peterhouse*, founded 1284 by Hugh de Balshan, Bishop of Ely; (2) *Clare*, founded 1326 by Richard de Badew, refounded by Lady Elizabeth, sister of Gilbert, Earl

of Clare; (3) *Pembroke*, founded as Valence-Mary Coll. 1347, by Mary de St. Paul, widow of Aymer de Valence, Earl of Pembroke; Henry VI. was great benefactor to this college, and is called second founder; (4) *Gonville and Caius*, founded 1348 by Edmund Gonville, rector of Terrington—name and situation changed by William Bateman, Bishop of Norwich, who was second founder; third founder was John Calus, M.D., who in 1558 obtained royal charter establishing his foundation; (5) *Trinity Hall*, founded 1350 by William Bateman, Bishop of Norwich; (6) *Corpus Christi*, founded 1352 by two societies, the Guilds of Corpus Christi and of Blessed Virgin Mary; (7) *King's*, founded 1441 by Henry VI.; *Queen's*, founded 1448 by Margaret of Anjou, queen of Henry VI.—refounded by Elizabeth Woodville, wife of Edward IV., 1465; (9) *St. Catherine's*, founded 1473 by Robert Wode-larke, D.D., chancellor of univ.; (10) *Jesus*, founded 1496 by John Alcock, Bishop of Ely; (11) *Christ's*, founded 1505 by Lady Margaret, Countess of Richmond and Derby, mother of Henry VII.; (12) *St. John's*, founded 1511 by the same; (13) *Magdalene*, founded 1519 by Thomas Baron Audley of Walden; (14) *Trinity*, founded 1546 by Henry VIII., by combining and extending two earlier foundations—Michaelhouse, 1324, and King's Hall, 1337; (15) *Emmanuel*, founded 1584 by Sir Walter Mildmay, chancellor of exchequer; (16) *Sidney Sussex*, founded 1594 under will of Frances, Dowager Countess of Sussex; (17) *Downing*, founded 1800 by Sir George Downing. There are two women's colleges, *Girton* and *Newnham*. Pop. 59,000.

CAMBRIDGE, a city of Maryland, the county seat of Dorchester co. It is on the Choptank River and on the Cambridge and Seaford Railroad. It is the center of an important meat growing and packing industry, and its industries include the manufacture of underwear and lumber. Pop. 1920, 7,467.

CAMBRIDGE, a city of Massachusetts, one of the county seats of Middlesex co. It is on the Charles River, and on the Boston and Albany and Boston and Maine railroads. Cambridge is connected with Boston by several large bridges. The city was formerly divided into villages called Old Cambridge, Cambridge Port, East Cambridge, and North Cambridge. Although these have all been joined in one city, the names are still used. In its early days Cambridge was a residential section for Boston and was chiefly notable as being the seat of Harvard University. It has grown,

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however, into a manufacturing center with varied industries, including the manufacture of glass, furniture, steam engines, bakery products, confectionery and rubber goods. The city was founded in 1630-31, under the name of Newtown. In addition to Harvard, Cambridge has many important historical associations and monuments. The first printing office in the United States was located here and the Bay Psalm Book was printed in 1640, one of the first printed books issued in the United States. The site of the Washington elm, under which George Washington took command of the Revolutionary army, on July 3, 1775, is preserved at the corner of Mason and Garden Streets. The famous Craigie House, built by Colonel John Vassal, in 1759, was the headquarters of Washington, in 1775-6. It later became the home of Henry W. Longfellow, the poet, and remained in the hands of his children after his death. It is now a museum containing many valuable mementos of the poet. 'Elmwood', the birthplace and former home of James Russell Lowell stands on Elm Avenue. Cambridge has been the home of many other notable persons, including Oliver Wendell Holmes, Margaret Fuller Ossoli, Louis Agassiz, John Fish, Charles Eliot Norton, and Charles W. Eliot, president emeritus of Harvard University. There are many handsome parks. In addition to Harvard University, there are many other important educational institutions, including Radcliffe College for Women, and the Massachusetts Institute of Technology. Mt. Auburn Cemetery, in which many famous Americans are buried, is partly in Cambridge and partly in Watertown. See HARVARD UNIVERSITY, RADCLIFFE COLLEGE, MASSACHUSETTS INSTITUTE OF TECHNOLOGY. Pop. 1920, 109,456; 1923, 115,230.

CAMBRIDGE, a city of Ohio, the county seat of Guernsey co. It is on the Pennsylvania, and the Baltimore and Ohio railroads. It is located in an important mining region and is a large shipping point for coal and oil. Its industries include tin plate mills, glove factories, earthenware plants, etc. Here are the division shops of the Pennsylvania Railroad. Its public buildings include a hospital, and a library. Pop. 1920, 13,104.

CAMBRIDGE, RICHARD OWEN (1717-1802), Eng. poet; wrote mock-epic, the *Scribleriad*, 1751.

CAMBRIDGESHIRE (52° 15' N., 0° 10' E.), inland county, England; bounded N. by Lincoln, E. by Norfolk, Suffolk, S. by Essex, Hertford, W. by

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Bedford, Huntingdon, Northampton; greatest length, 48 miles; breadth, c. 30 miles; area, 864 sq. miles; surface generally flat, fens in N. Chief rivers are Ouse, Cam, Nene, Lark; many canals. Capital is Cambridge. C. produces wheat, hemp, flax, corn, beans, and other crops; dairy produce; sheep and cattle raised; industries include brewing, malting, milling, brickmaking, potteries, lime burning, paper. In E. is Newmarket, famed for racing. C. was occupied by Romans, of whose occupation traces remain; suffered during civil wars of Stephen, John, and Henry III.'s reigns; supported Parliament in Civil War of Charles I.'s reign. Pop. 1921, 129,594.

CAMBUSLANG (55° 50' N., 4° 10' W.), town, on Clyde, Lanarkshire, Scotland; large steel and iron works. Pop. 15,000.

CAMBYSES, s. of Cyrus the Great, founder of Persian Empire; succ. his f. c. 529 B.C., conquered Egypt in 525, and after an unsuccessful attempt against Ethiopia, d. in Syria; the name has become associated with a bombastic style, this Shakespeare speaks of 'in King Cambyse's vein.'

CAMDEN, a city of New Jersey, the county seat of Camden co. It is on the Delaware River and is a port of entry. Camden is opposite Philadelphia with which it is connected by several ferries. It is noted for its large market gardens and is also important industrially and is the site of several large shipbuilding plants which were especially prosperous during the World War. The city has an excellent system of paved streets, unusually good educational facilities, including private and public schools. The chief industries are shipbuilding, the manufacture of worsted goods, oilcloth, boots and shoes, phonographs, foundry products, pens, soups, etc. Camden received a city charter in 1828 and with the completion of the Camden and Amboy Railroad, in 1883, became an important business and commercial center. Pop. 1920, 116,309.

CAMDEN, a city of South Carolina, the county seat of Kershaw co. It is on the Southern, the Atlantic Coast Line, and other railroads, and is 32 miles N.E. of Columbia. Its clear and invigorating climate make it a favorite health resort for sufferers from throat and lung troubles. It has important cotton and grain industries. Camden is important historically as it was the site of two famous battles. On April 16, 1780, an American army under General Gates was signally defeated by an English army commanded by Lord Cornwallis.

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In this battle, Baron DeKalb, commanding the right wing of the American army, was mortally wounded. A monument was erected by Congress in his honor on a street which has his name. On April 25, 1781, General Greene, who had succeeded General Gates, was defeated by Lord Rowden commanding the English forces at Hobbskirk Hill, near Camden. The city was captured by General Sherman on February 24, 1865, after a series of battles in the neighborhood.

CAMDEN, CHARLES PRATT, 1ST EARL (1714-94), Lord Chancellor of England; 3rd s. of Sir John Pratt, Chief Justice of King's Bench; through Pitt's influence made attorney-general; knighted 1762, and made Chief Justice of the Common Pleas; raised to peerage, 1765; prominent figure at time of John Wilkes' persecution.

CAMDEN, JOHN JEFFREYS PRATT, 1ST MARQUIS (1759-1840), only s. of 1st earl; under Pitt's ministry made Lord-Lieutenant of Ireland; Chancellor of Cambridge Univ.; K.G.

CAMDEN, WILLIAM (1551-1623), Eng. antiquary; ed. London and Oxford, afterwards spent considerable time travelling about England collecting materials for his *Britannia*, 1586; headmaster, Westminster School, 1593; Clarenceux King-at-Arms, 1597. The famous *Britannia* is a survey of Brit. Isles, written in Latin; trans. into English, 1610.

CAMEL FAMILY (*Camelidae*), includes Camels and Llamas, and forms by itself the group *Tylopoda* among even-toed Ungulates (*Artiodactyla*). They are long-necked, long-limbed, and large-bodied animals, with only the third and fourth digits persisting. The place of hoofs, which are poorly developed, is taken by thick pads of skin. Camels and their relatives ruminate, but the first and second compartments of the stomach are peculiar in having pouches in their walls, wherein fluid can be retained and used at will. They differ from all mammals and resemble the lower vertebrates in possessing oval instead of circular red blood corpuscles.

Only two species of *Camelus* exist—the two-humped Bactrian Camel (*C. bactrianus*), still found wild in the desert area of Central Asia, and the wholly domesticated Arabian Camel or Dromedary (*C. dromedarius*), with a single lump of fat, found throughout Africa and S.E. Asia. In S. America occur the Llamas (*Lama*), valuable on account of their wool, with two wild species, the larger Guanaco or Huanaco, and the smaller Vicuña; and the domesticated true Llama and Alpaca.

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CAMELFORD, mrkt. tn., Lanteglos, Cornwall, England (50° 57' N., 4° 40' W.); was anc. bor.; tourist center; traditionally associated with King Arthur, and supposed by some to be Camelot; cheese factory; clay works; slate quarries. Pop. 7,400.

CAMELLIA, order *Ternstroemiaceae*, evergreens; includes greenhouse species *C. japonica*, with numerous varieties: *C. reticulata*, (introduced from China, and *C. oleifera*.

CAMELODUNUM, modern Colchester, Brit. town and later Rom. colony; destroyed in rising of Boadicea 61 A.D., but rebuilt; walls remain.

CAMEO. See GEM.

CAMERA, word meaning an 'arched room,' and applied to private rooms in court, whence 'in camera,' the private hearing of a case; criminal cases may not be so heard, nor may adult persons be ordered out of court during a public hearing.

CAMERA LUCIDA, optical instrument used for perspective drawing.

CAMERINO (43° 8' N., 13° 4' E.), city, Italy; cathedral and univ. 1727. Pop. 12,000.

CAMERARIUS, RUDOLF JAKOB (1665-1721), Ger. physician and botanist; prof. of Med. and head of botanic gardens at Tübingen, 1687; investigated reproductive organs of plants.

CAMERA OBSCURA, darkened chamber, having aperture, furnished with lens and mirror, through which light enters and forms images of external objects on surface opposite. See PHOTOPLAY.

CAMERON, EDGAR SPIER (1862); son of John Rush and Emily Spier Cameron. Educated at public schools. Studied art in Chicago Academy of Design, Art Students League, New York and Académie Julien and École des Beaux Arts, Paris. Acted as Art Critic, Chicago Tribune from 1891 to 1900. Worked on decorations for Chicago Exposition, 1893. His Dreamland and a group of paintings awarded prize and later exhibited at Royal Academy, Berlin. Awarded the Butler prize, Art Institute, Chicago, 1913; Clyde-Carr and Rosenwald prize, 1917. One of the founders of Municipal Art League, Chicago.

CAMERON, GEORGE HAMILTON (1861), son of Dwight Foster and Fanny Elizabeth Norris Cameron. Graduated at United States Military Academy, West Point, in 1883. Commissioned

second-lieutenant of Cavalry in 1883. Promoted through successive ranks to Colonel of Cavalry in 1916. During World War was commissioned brigadier-general. Commanded 4th Division of Regular Army in France in 1918. Commanded 5th Corps, A.E.F. in Oct. 1918, and took part in St. Mihiel and Argonne-Meuse offensive.

CAMERON, RALPH HENRY (1863), s. of Henry and Abbeigill Jones Cameron. Educated in the public schools. Was a miner and had interests in various copper and silver mines in Arizona. Locater and builder of the Bright Angel Trail into the Grand Canyon of the Colorado in Arizona. Became delegate from Arizona to 61st Congress. Elected to United States Senate in 1921 for term ending in 1927. Is a Republican in politics.

CAMERON, SIMON (1799-1889), an American statesman. Having learned the printing trade when still a small boy, he became editor of newspapers in Doylestown and Harrisburg, Pa. Later he became interested in banking, railroad construction, and politics. From 1845 to 1849 he served as Senator from his native state, having been elected by the Democratic party. He was one of the original members of the Republican party by which he was again elected Senator in 1856. In 1861 he was appointed Secretary of War by President Lincoln, resigning in 1862 when he went to Russia as U.S. minister. There he gained Russian support for the Union, but resigned in November 1862. In 1866 he was again elected to the Senate, becoming chairman of the Foreign Affairs Committee in 1872. He retired in 1877, being succeeded by his son, James Donald Cameron. Throughout his entire political career his influence in the national councils of his party was very powerful and practically absolute in his native State.

CAMERON, VERNY LOVETT (1844-94), African traveler; pub. *Across Africa*, 1877, and, with Sir Fredk. Burton, *To the Gold Coast for Gold*, 1883.

CAMERON OF LOCHIEL, SIR EWEN (1629-1719), Highland chieftain; head of Clan Cameron; knighted, 1681; served with Dundee at *Killiecrankie*, 1689; man of vast strength and size (see Scott's *Lady of the Lake*, V.); grandson, Donald, shared in the '45 rebellion.

CAMERONIANS, sect of Scot. Covenanters, later known as Reformed Presbyterians, founded by Richard Cameron, 1648-80; the Cameronian Regiment was formed from their body.

CAMILING (15° 40' N., 120° 27' E.),

town, Luzon, Philippine Islands; sugar, rice, ind. corn, and timber. Pop. 23,000.

CAMILLA, queen who led the Volsci against the Trojans in the *Aeneid*.

CAMILLUS, MARCUS FURIUS (d. 365 B.C.), Rom. dictator and soldier; won victories over the Volsci and Etruscans; repelled Gaulish invasion, 367.

CAMINETTI, ANTHONY (1854); American public official. Educated at Jackson, Oakland and San Francisco and was admitted to the California bar in 1877. Member California Assembly, 25th, 32nd, and 33rd sessions. State Senate 27th and 28th sessions. Was a member of Congress from 1891 to 1895. Appointed Commissioner General of Immigration by President Wilson. He was also author of the law known as the 'Caminetti Law' passed by Congress in 1893, under which hydraulic mining was resumed in California and was chairman of the California commission for the revision and reform of the law.

CAMISARDS, Huguenot peasants of the Cevennes, who from 1702 onwards maintained an armed resistance against the *Dragonnades*. The persecution began as early as 1681, when Louis XIV. quartered dragoons in Prot. houses to compel them to renounce their faith. The name is derived from the smock (*camise*) worn over the armor in night attacks to distinguish friends from enemies.

CAMOENS, LUIS DE, CAMOES (1524-80), Portugal's greatest poet; b. Lisbon, of noble descent; graduated at Colmbra Univ., of which he was an 'honorable poor student'; removed to Lisbon at age of eighteen, and became a tutor. In 1544 he made the chance acquaintance of Caterina de Ataíde, a girl of thirteen, in attendance upon the queen. For Caterina C. conceived a violent passion, which she appears to have reciprocated, but her parents discouraged the affair, which ultimately led to the poet being banished from Lisbon. C. had already written a number of poems inspired by his love for Caterina, and others were produced during his absence. In 1547 he entered the army, and for over two years was at Ceuta, where he lost the use of his right eye in a skirmish.

He returned to Lisbon in 1550, and, finding no employment, he seems for three years to have led a disorderly life; was imprisoned for assault upon a royal servant, and was only released upon volunteering for service in India. After seeing Caterina for the last time, the poet shipped for Goa in 1553, and did not return to Portugal for sixteen

years. During this period of foreign service C. wrote his masterpiece, *The Lusíads*, on the explorations of Vasco da Gama. It consists of ten cantos.

CAMORTA ISLAND (8° 15' N., 93° 38' E.), one of Nicobar Islands, Bay of Bengal.

CAMOUFLAGE (Fr. *argot*), introduced as a military term during the World War, signifies disguise with a view to concealment and deception of the enemy; also the means or material, manufactured or natural, used for the purpose. Forms of camouflage were familiar to ancient and mediæval armies, and some of them foreshadowed the modern methods. During the long period of trench warfare in the World War camouflage was practiced as a fine art, not only to counter observation at the extremely close ranges of the opposing trenches, but also from aircraft attempting to take aeroplane photographs. Surface indications, inconspicuous from the ground, are clearly visible in expert examinations of these photographs, and it is specially noticeable that the shadows of trees or hedges are sharper than their actual foliage. Ideal camouflage should therefore reproduce the appearance of the surface which it covers in color, form, and texture, and should avoid unnatural regularity in the creation of light and shadow—extremely difficult to achieve under severe conditions. But imperfect camouflage is better than none, as it renders targets less easy to discover and less distinct when discovered; it also forces ranging aeroplanes to descend to heights where they can be seriously distracted by gunfire from the ground.

Infantry.—The forward observation posts and embrasures of machine-gun emplacements were camouflaged by the use of imitation bricks or sandbags with gauze-covered holes, let into parapets or the ruined walls of trenches. Loose suits painted green were provided for snipers; in night raids faces of men were blackened and white was worn when snow was on the ground. Important trenches were camouflaged, and communication trenches roofed with turf.

Artillery.—Framework of wire or fish netting decorated with imitation grass or foliage was used for concealing batteries; painted sheets for covering spoil, ammunition, or stores. Field batteries were more difficult to conceal, and the scheme was decided on by reference to aeroplane photographs. Landscape was frequently altered by heightening hedges or walls, or making false crests to hide movements of ammunition or flashes of the guns. Blast marks were concealed by sheets, removed

during firing, and by other devices. Heavy guns were sometimes placed amidst imitation ruins or fields of cultivation. Most guns were painted in such a way as to break up the shape of the weapon by blending parts of it with the surroundings; the colors were usually green, cream, and brown.

Lines of Communication were concealed by screens of painted canvas or strips of canvas, branches, or grass on framework of wire, usually placed at some distance from edge of road; such screens often extended for many miles. Protective painting was also applied to huts, camps, aeroplanes, and dumps behind the lines. For concealing the movements of troops on a grand scale camouflage was reinforced by other methods, such as marching only by night, rigidly avoiding the formation of new tracks, and dummy preparations elsewhere.

Sea Warfare.—Q-boats were used to deceive German submarines; steamers and sailing ships employed for the purpose carried concealed guns, and were manned by men of the royal navy, who in dress and demeanor appeared to be merchant seamen. 'Panic parties' abandoned ship when submarine appeared, and the deception was continued until she was within easy range, when the guns were unmasked. 'Dazzle painting' was carried out on an extensive scale so as to deceive the enemy as to the course and speed of the target ship.

Dummy Work.—Wooden dummies of the battle-cruiser *Tiger* and the battleship *Collingwood* were used at the Dardanelles, where the dummy *Tiger* was sunk by a torpedo, and the crew floated off on one of the turrets. These dummies were intended to deceive the enemy as to location of their originals. Dummy periscopes were towed behind submerged submarines. Dummy batteries, with artificial flashes, were used by the Turks, and were sited some distance from the real guns. Wooden howitzers, dummy heads, dummy periscopes, and dummy figures of men ('Chinese infantry') were also used to deceive the enemy. Screens were often used which concealed nothing.

Open Warfare.—During the moving warfare in 1918 camouflage was of little or no account, owing to the rapid change of positions, and batteries and brigades of artillery frequently went into action in line in the open, as in 1914, without any camouflage, natural or artificial.

CAMP (Lat. *campus*, plain), in modern use, applied to a temporary tented settlement, as opposed to bivouac; ancient Rom. c's (*castra*) were strong, permanent forts, usually built on an eminence. They were laid out in a symmetrical way

CAMP

like the Roman town, into which the permanent c's (*castra stativa*) often developed. The c. formed a great square of just over a mile, and was bounded by mound (*agger*), surmounted by palisade (*vallum*); the cavity left without by throwing up the mound was part of the fortification, viz. the ditch (*fossa*). The tents, separated from the fortifications by the *intervallum*, were divided into two parts by the *Via Principalis*, at either end of which were the principal issues from the fort; on one side were the officers' quarters, with the *Praetorium* in the center, on the other side the legions; from the *Praetorium*, on the *Via Principalis*, the *Via Praetoria* traversed the soldiers' quarters, in the midst of which it was intersected by the *Via Quintana*, to the *Porta Praetoria*.

CAMP, CHARLES WADSWORTH (1879), American writer, son of Charles Henry and Emma Martin Camp. Graduated from Princeton University in 1902- and was a reporter and correspondent for the New York Evening Sun from 1902-5. Was managing editor for the Metropolitan Magazine from 1906-9. Belonged to Company H., 7th Regiment, N.G.N.Y. and graduated from 1st Officers Training Camp at Plattsburg in 1917. He was the author of *Sinister Island*, 1915; *The House of Fear*, 1916; *Wars Dark Frame*, 1917; *The Abandoned Room*, 1917; *History of the 805th Field Artillery*, 1919; *The Gray Mask*, 1920; *The Guarded Heights*, 1921, and numerous short stories.

CAMP, WALTER (1859), American writer on sports. Graduated from Yale in 1880. Was Yale representative of the National College Athletic Association; president, treasurer and general manager of the New Haven Clock Co. and a director of Peck Brothers Company. Author of numerous books and contributor to many leading magazines. Among his works are: *Jack Hall of Yale*; *Danney Fists*; *Captain Danney*; *Danney the Freshman*; *Bridge Don'ts*; *Auction Bridge Up to Date*; *Book of College Sports*; *American Football*; *Yale, Her Campus, Class-room and Athletics*; *The Substitute*; *Old Ryerson*, and *Keeping Fit All the Way*. Was a Member of the Navy Commission on Training Camp Activities.

CAMPAGNA DI ROMA (42° N., 12° 10' E.), low, undulating plain surrounding Rome, nearly corresponding to ancient Latium; uncultivated and unhealthy.

CAMPAN, JEANNE LOUISE HENRIETTE (1752-1822), confidante of Marie Antoinette; remained with queen

CAMPANINI

until taken away at sacking of Tuilleries; after the Terror established a school at St. Germain; wrote *Memoires sur la vie privee de Marie Antoinette*; pioneer of training girls in domestic economy.

CAMPANELLA, TOMMASO (1568-1639), Ital. philosopher and poet; was for some time a Dominican; attempted reform of philosophy; opposed Scholasticism, relying rather upon ancient systems, and devoted to study of nature; imprisoned twenty-seven years as rebel against Span. tyranny in Naples, and detained by Inquisition; liberated in 1629; found a patron in the pope and later in Richelieu; sonnets trans. into English by J. A. Symonds, 1878.

CAMPANHA (21° 53' S., 45° 11' W.), town, Minas Geraes, Brazil; thermal springs. Pop. 6,500.

CAMPANIA (41° N., 14° 40' E.), territorial division, Italy; includes provinces of Avellino, Benevento, Caserta, Naples, Salerno. C. borders on Tyrrhenian Sea; area, c. 6,400 sq. miles; much of surface occupied by Apennines; highest peaks, Monte Cervato, Alburno, Montagna del Matese; Vesuvius; some fertile plains and valleys; drained by Volturno, Sele, etc.; noted for beautiful scenery and fertility; produces oranges, olives, chestnuts, wine, wheat, maize, pulse, hemp; sulphur found in large quantities, and petroleum; agricultural districts have dense population. C. was invaded in early times by Greeks, who founded Naples and Cumae; conquered by Etruscans, who founded Capua and were subdued by Samnites; came under Rom. control, IV cent. B.C.; favorite resort of rich Romans; belonged to kingdom of Naples till 1860; area, 6,290 sq. miles. Pop. 3,427,000.

CAMPANI-ALIMENIS, MATTEO (c. 1678), Ital. mechanician; invented noiseless clock and illuminated dial-plate; wrote on horology and telescopes.

CAMPANILE (Lat. *campana*, a bell), large bell-tower belonging to, but usually detached from, church; they are found throughout Italy, the most noted being Giotto's Tower, Florence; St. Mark's, Venice, and the 'leaning tower' of Pisa. Giotto's campanile, built 1334, stands 275 ft. high, is in five stories, the outer surface being encased in three colors of marble, and it was originally intended that a spire, 90 ft. high, should rise from the present summit. Still loftier, 396 ft., is Cremona c. The Pisa tower is an example of the round c.

CAMPANINI, CLEOFONTE (1860), an Italian musical director; b. Parma,

CAMPANINI

Italy. He studied music at the Royal Conservatory of Parma, beginning his work as director likewise in his native town, in 1881. He rapidly acquired an international reputation. From 1897 to 1906 he was director of the Royal Opera, Covent Garden, London; from 1906 to 1909 of the Manhattan Opera Company; from 1910 to 1913 of the Chicago and Philadelphia Opera Companies, and from 1913 until his death in 1919 general manager of these two companies.

CAMPANINI, ITALO (1846-1896), an Italian singer; b. Parma, Italy. Having served in Garibaldi's army, while still a boy, he later studied music at the Royal Conservatory in Parma, and later with Lamperti at Milan. His first success was made in *Faust* at La Scala, Milan. After a London appearance in 1872 he came to the United States in 1873 as a member of the Nilsson company, appearing in *Lucrezia Borgia*. He was considered one of the finest tenors of his time until a disease of the throat somewhat impaired his voice.

CAMPANULA (Lat. *campana*, bell), genus of plants of family Campanulaceæ, having bell-shaped corolla; several species called Canterbury bell.

CAMPASPE, renowned beauty, mistress of Alexander the Great; heroine of *Lyly's Alexander and C.*

CAMPBELL ISLAND (c. 55° S., 190° W.), desolate volcanic island, S. of New Zealand.

CAMPBELL, Scot. Highland clan; probably Celtic tribe. From Duncan, Lord C., cr. 1445, have descended the Marquesses and Dukes of Argyll, the Earls and Marquesses of Breadalbane, and the Earls of Cawdor.

CAMPBELL, ALEXANDER (1788-1866), Amer. evangelist; pres. of Bethany Coll.; preached throughout England, Scotland, and U.S.A.

The Campbellites, or Disciples of Christ, are a sect formed c. 1812 from the Baptists, giving more importance to immersion; they have c. 5,000 members in Britain and c. 600,000 in U.S.A. Name also given to followers of John M'Leod C., of Row, Dumbartonshire, also called Rowites, who established church at Glasgow, 1833.

CAMPBELL, COLIN, BARON CLYDE (1792-1863), served in Peninsular War, America, Sikh War, 1848, Crimea, and Ind. Mutiny; relieved Lucknow and received a peerage and pension.

CAMPBELL, JOHN CAMPBELL,

CAMPBELL

BARON (1779-1861), Lord Chancellor of England; wrote *Lives of the Lord Chancellors of England*, 7 vols., 1849; also *Lives of the Chief Justices of England*.

CAMPBELL, LEWIS (1830-1908), Scot. classical scholar; eminent for his trans. from Plato, Æschylus, and Sophocles.

CAMPBELL, MRS. PATRICK (1865); Eng. actress; first success at Adelphi Theatre, 1892; she created the part of *Second Mrs. Tanqueray*, 1893, at St. James's. Has played with Beerbohm Tree, Forbes-Robertson, and Sarah Bernhardt. Toured U.S. in 1901, 1907, 1910, and 1914. Created *Eliza Doolittle* in *Pygmalion*, by George Bernard Shaw, 1914, and George Sand in *Madame Sand*, 1920.

CAMPBELL, PRINCE LUCIAN (1861), American educator. Graduated from Christian College, Monmouth, Oregon, in 1879, and received his A.B. from Harvard in 1886; LL.D., Pacific University, 1911; University of Colorado, 1913. Was made President of the University of Oregon in 1902, and Vice-President of the National Association of State Universities in 1916. Member of the executive committee of the Y.M.C.A. of Oregon and Idaho.

CAMPBELL, REGINALD JOHN (1867), Eng. preacher; succeeded Dr. Parker at City Temple, 1903; published two books on *Immanence*, 1917, which aroused controversy; visited U.S., 1911; entered Church of England, 1915; vicar of Christ Church, Victoria Street, London, since 1917.

CAMPBELL, THOMAS (1777-1844), Scot. poet; b. Glasgow; went to Edinburgh, where Sir Walter Scott, Jeffrey, and John Leyden were amongst his contemporaries. His most ambitious poem, *The Pleasures of Hope*, appeared in 1799. Its success was immediate, but it is now forgotten. Campbell was a laborious writer. He will live by virtue of his patriotic lyrics, of which, *Ye Mariners of England* and *The Battle of the Baltic* are amongst the finest in the language; *Life*, by Beattie, 1849, Hadden, 1899.

CAMPBELL, WILLIAM (1876), American scientist. Graduated from the Civil Service Dept., Kings College, London, 1892; St. Kenelms College, Cowley, Oxford, 1892-4; Durham University College of Science, 1894-7; A.Sc., 1896; B.Sc., 1897; M.Sc., 1903; Sc.D., 1905; Royal School of Mines, London, 1899-1901; also Ph.D., 1903; and A.M., 1905, Columbia University. Was a lecturer and instructor in geology and metallurgy. Metallographer Technologic Branch of the U.S. Geol. Survey. 1907-11, and

metallographer of the Bureau of Mines 1911. Editor of the *School of Mines Quarterly*, 1910. Was awarded the Saville Shaw Medal by the Society of Chemical Industry (British), 1903.

CAMPBELL, WILLIAM WALLACE (1862), American scientist; B.S. Univ. of Michigan, 1886. Hon. M.S., 1899; Sc.D., Western University of Pennsylvania, 1900; University of Michigan, 1905; LL.D., University of Wisconsin, 1902.) In charge of Lick University Eclipse Expedition to India, 1897-8, to Georgia, April-June, 1900, to Spain, August, 1905, to Flint Island, Jan., 1908, to Kiev., Russia, 1914, and to Golden-dale, Washington, July, 1918. Received gold medal, Royal Astron. Society, 1906; Janssen prize gold medal, Paris Academy of Sciences, 1910. Pres. A.A.A. S., 1915; member National Academy of Sciences and several other scientific societies and associations both American and foreign. Author of *The Elements of Practical Astronomy*, 1899; *Stellar Motions*, 1913, and numerous papers in astronomical journals.

CAMPBELL - BANNERMAN, SIR HENRY (1836-1908), Brit. statesman; M.P. for Stirling Burghs from 1868 to death; financial secretary to War Office, 1870-4, and again, 1880-2; secretary to Admiralty, 1882-4; chief secretary for Ireland, 1885. In Gladstone's Home Rule government of 1886 he was secretary for war, and again in 1892, under Rosebery's premiership, when the government was defeated on the cor-dite vote, June 21, 1895. Strongly disapproved of Boer War, which caused split in Liberal party and formation of Liberal League under Rosebery; leader of Liberal party in House of Commons, 1889. His attitude on S. African War won him much unpopularity, but after crushing defeat of the Unionists, 1906, he became prime minister. Chief features of his administration were granting of constitution and responsible government to Transvaal, and prohibition of further importation of Chinese labor. Resigned April, 1908, and died three weeks later. A popular party leader, courageous, sincere.

CAMPECHE, CAMPEACHY (19° N., 90° W.), state, Mexico, occupying S.W. sq. of Yucatan peninsula; area, 18,000 sq. miles. Pop. 90,000.

CAMPECHE (19° 50' N., 90° 33' W.), seaport, on Bay of C., capital of C. state; shallow harbor; chief exports, logwood, hides, and wax; cigars manufactured. Pop. 17,000.

CAMPEGGIO, LORENZO (1464-1532), Ital. cardinal; made bp. of Salis-

bury by Henry VIII., and was also abp. of Bologna; chiefly notorious for his connection with the divorce of Catherine of Aragon. His private instructions from Rome were to defer a final settlement of the case, in following which he displeased the king; hence Henry's final rupture with the pope.

CAMPER, PETER (1722-89), Dutch anatomist, prof. of Med. Surgery, and Anat. at different univ's in Holland; later was engaged in politics.

CAMPERDOWN, town, c. 30 miles N. of Amsterdam; off it Brit. fleet under Duncan gained victory over Dutch, 1797. The victor was cr. Viscount Duncan of C.; in 1831 his s., Robert Dundas, was cr. earl of C.

CAMPFIRE GIRLS, an organization for girls, founded in 1912, by Dr. and Mrs. Luther H. Gulick. Its purpose is 'to perpetuate the spiritual ideals of the home under the new conditions of a Social Community.' Its work fosters especially the formation of habits making for health and vigor and the promotion of various forms of welfare work and lays special stress on outdoor life and exercise. The membership in 1922 consisted of over 7,000 camp fires with over 150,000 members. The main organization is in the United States, but similar organizations are in 17 other countries. National headquarters are located in New York City. President, Mrs. Oliver Harriman.

CAMPFAUSEN, OTTO VON (1812-96), Prussian statesman; Minister of Finance, 1869; warm advocate of free trade principles; received order of Black Eagle, 1895.

CAMPFAUSEN, WILHELM (1818-85), Ger. artist; famous for his battle pictures, many of his subjects being taken from XVII.-cent. history; also portraits of modern Ger. celebrities.

CAMPFORS, chemical compounds used medicinally as diaphoretics and antispasmodics. Laurel Camphor (C₁₀H₁₆O) is volatile, white, crystalline, semi-transparent; M.P. 175°, B.P. 204°; soluble in alcohol and ether; obtained from wood of *Laurus camphora* of China, Japan. Borneo Camphor (C₁₅H₁₈O), obtained from *Dryobalanops camphora*, has similar properties.

CAMPHUYSEN, DIRK RAFAELSZ (1586-1627), Dutch artist; his landscapes, though small, are much valued.

CAMPI, GIULIO (1500-72), Ital. artist and founder of a school; his principal works are to be found in the Church of St. Margaret, Cremona.

CAMPILLO, JOSÉ DEL (1695-1743), Span. statesman; rose from lowly origin to be Prime Minister; did much to reform collection of taxes.

CAMPINAS (22° 35' S., 46° 48' W.), city, São Paulo, Brazil; coffee and sugar plantations. Pop. 16,000.

CAMPION, EDMUND (1540-81), Eng. Jesuit; after taking deacon's orders in Church of England he joined the Society of Jesus; was sent with Robert Parsons to conduct a mission in England, 1580, and led a hunted life in various parts of the country; executed at Tyburn; beatified, 1886.

CAMPION, THOMAS (1567-1620), Eng. poet and musician; his several *Bookes of Ayres*, words and music by himself, constitute his title to be considered in the front rank of Jacobean lyric poets; also wrote number of masques.

CAMPISTRON, JEAN GALBERT DE (1656-1723), Fr. dramatist; wrote plays in manner of Racine, and the libretto of an opera, *Acis et Galathee*; held official post under Duc de Vendôme; member of Academy, 1701.

CAMP MEETINGS, religious gatherings held in temporary encampments, and usually continued for about a week. Originated with Methodist Church in America 1799.

CAMPO (2° 25' N., 9° 58' E.), trading station, Kamerun, Ger. W. Africa.

CAMPO FORMIO (46° 1' N., 13° 11' E.), town, N. Italy; treaty between Austria and France signed here, 1797.

CAMPO SANTO, consecrated burial-ground in Italy and Spain.

CAMPOAMOR Y CAMPOOSORIO, RAMON DE (1817-1901), Span. poet; secured reputation as a writer of epigrams under the name of *Doloras*, in which humor and philosophy are blended.

CAMPOBASSO (41° 33' N., 14° 41' E.), city and province, Italy; famous for cutlery. Pop. 11,000.

CAMPOBELLO.—(1) (37° 38' N., 12° 43' E.) town, Trapani, Sicily; old quarries. Pop. 9,000. (2) (37° 15' N., 13° 56' E.) town, Girgenti, Sicily; sulphur. Pop. 11,000.

CAMPOMANES, PEDRO RODRIGUEZ, COUNT (1723-1802), Span. statesman; sometime president of the Council of Castile; translated *Voyage of Hanno the Carthaginian*, and published several original works.

CAMPOS (21° 42' S., 41° 20' W.),

city, on Parahyba, Rio de Janeiro, Brazil; has trade in sugar, coffee, brandy. Pop. 30,000.

CAMPOS, ARSENIO MARTINEZ DE (1831-1900), Span. general, through whose efforts Alfonso XII. was restored to Spanish throne.

CAMPULUNG (45° 15' N., 24° 57' E.), town, Rumania; summer resort; was first capital of Walachia in XIV. cent. Pop. 13,000.

CAMUCCINI, VINCENZO (1773-1844), Ital. artist; famous chiefly for hist. pictures, of which his *Assassination of Caesar* and *Death of Virginia* may be instanced.

CANAAN, name applied first to coast regions of Palestine and district drained by Jordan, later given to whole Palestine W. of Jordan.

CANAANITES, general term often applied in Old Testament to the heathen peoples dwelling between Jordan and Mediterranean; they worshiped Astarte and Baal, and sacrificed children in their heathen rites.

CANADA, British overseas Dominion, covering all the northern half of North America except Alaska and Newfoundland (41°-52° N., 57°-141° W.); it includes long fringe of islands in N. and N.E., stretching towards Pole; bounded N. by Arctic Ocean, E. by Atlantic and Newfoundland, S. by U.S., W. by Alaska and Pacific Ocean.

The E. coast is broken up by Hudson Strait and Bay, James Bay, Gulf of St. Lawrence, Bay of Fundy; importance of first three as harbors lessened by ice in winter, of last by height of tides and strength of tidal currents; W. coast much broken, fringed with islands; N. coast commercially useless on account of latitude; S.E. is cut up by chain of great lakes—biggest fresh water area in world; largest are Lakes Superior and Huron.

Along E. coast, by Labrador, Cape Breton I., and Nova Scotia, are low hills; while S.E. of St. Lawrence basin is bounded by northern extension of Appalachians, with height of c. 4,000 ft. Along N.W. of St. Lawrence basin, of Great Lakes, and of their northern feeders, stretch Laurentian Plateau and Laurentian Range, with heights of from 1,000 to 3,000 ft. From N.N.W. to S.S.E., towards Pacific coast, run Rocky Mountains and parallel Selkirk and Cascade Ranges, with great intervening valleys and with average height of c. 8,000 ft.; highest peaks, Mts. Hooker, 15,700 ft., Murchison, 15,789, Brown, 16,000. Between Laurentian Range, N. of Lake Superior, and foothills of



Rockies, is enormous stretch of fertile prairie land, important for wheat growing and stock rearing; district E. and W. of this are in many parts densely wooded. The N. is partly plateau, partly plain, valuable for minerals and fur-bearing animals. The great northern and north-eastern stretch drained by Upper Yukon; Mackenzie, Coppermine, Great Fish or Back rivers, flowing to Arctic; Churchill, Nelson, Albany, entering Hudson Bay; E., S., and center drained by St. Lawrence and its tributaries, Ottawa, etc., Red River, Assiniboine, Saskatchewan; S.W. by Fraser and upper waters of the Columbia. Climate varies greatly; is generally one of extremes. Temp. in center ranges from 44° to 88° F.; rainfall sufficient everywhere. Extreme length c. 2,100 m., width 3,600 m.; area, c. 3,730,000 sq. m.

There are many sources of wealth. Central district is one of the great wheat areas of the world; cattle rearing, fruit growing, dairying are important industries; has great quantities of timber; extensive fisheries—lobster, salmon, herring, cod, mackerel; mineral deposits are valuable, including gold, coal, copper, nickel, silver, petroleum, asbestos, lead, iron. Exports include lumber, cheese, cattle, wheat, flour, bacon, fish, apples, skins, furs, sheep, butter, eggs, beef, paper, wood pulp, leather, etc.; the imports—textiles, machinery, iron and steel manufactures, clothing, salt, coal, chemical products, etc. Canada has system of protection, but there is a preferential tariff in favor of U.K. and some of her colonies. Railway mileage is about 38,604, and is rapidly extending; Canadian Pacific Ry., running from Montreal to Vancouver, not counting innumerable branches, has a length of 2,903 m., and was opened in 1885; other leading lines are National Transcontinental, Canadian Northern, and Grand Trunk Pacific from Moncton, New Brunswick, to Prince Rupert on Pacific coast, begun 1904, with government aid, and completed 1914. Besides navigable rivers and great lakes, there is fine system of canals; shipping is of great importance. Telegraphic and postal communications are good.

History.—About A.D. 1000 some Norse explorers from Greenland established in Canada a settlement whose situation is unknown; but they were soon overwhelmed and their settlement destroyed by Indians, who remained in undisputed possession until the coming of European explorers late in XV. cent. John Cabot was first to reach E. coast of Canada in 1497, and his son Sebastian afterwards carried out further explorations. First settlements, however, were made by French; great part of coast was

explored by corsair Verrazano in 1524, and ten years later Cartier formally annexed country in name of Fr. king, exploring St. Lawrence river in 1535. The colony he tried to establish, with the aid of Lieut.-gen. Roberval, proved a failure, as also were later settlements made by Marquis de la Roche in 1598 and by Chauvin and Pontgravé in 1599. In 1603 Samuel de Champlain received royal charter, and in 1604 he, with Sieur de Monts, established settlement at St. Croix, afterwards removed to Port Royal in Acadia; in 1608 he founded Quebec, and later a trading center at Montreal, and discovered several lakes. His support of the Hurons against Iroquois in 1609 and 1615 excited hostility of latter to France, so that when, later on, war broke out with England they supported Eng. arms.

In 1613 Port Royal was plundered and burnt by the Eng. seaman Argall, but was later rebuilt. In 1621 English made attempt at settlement in Acadia, calling it Nova Scotia. In 1625 first Jesuit missionaries came to Canada, and for some time exercised great influence in conduct of affairs. Richelieu established Company of New France in 1627, to which management of affairs in Canada was entrusted. English took Port Royal in 1628, Quebec in 1629; but in 1632, by Treaty of St. Germain-en-Laye, these, with the whole of Acadia, were restored to France. Champlain, who had been taken prisoner by English, returned to Canada in 1633, acting as governor until his death in 1635. Permanent settlement was made at Montreal in 1642, one of founders, Laval, becoming Bishop of Canada and was head of Church. In 1654 Acadia was again captured by British, but it was restored to France by Treaty of Breda, 1667. Meantime management of Company of New France came to an end, their charter being cancelled by Louis XIV. in 1663, when Canada became a crown colony. Administration was now carried out by the government, assisted by Intendant and supreme council. First governor, de Mézy, came to loggerheads with Bishop Laval, and was ordered to France, but died suddenly. For a time de Tracy acted as viceroy, and reduced Mohawks to submission. Frontenac, who became governor in 1672, was unrivalled in his treatment of the Indians; during his administration Mississippi was explored, and English made further settlements in Hudson's Bay and other districts. He was recalled in 1681; his successor, Denonville, was guilty of treachery towards the Iroquois, who in revenge organized terrible massacre of La Chine, 1689. The recall of Denonville followed and Frontenac returned.

Meantime English made an alliance with Iroquois; suspecting which, Frontenac sent parties of Indians and French to attack Eng. settlements; several massacres occurred, and Eng. colonists determined on war. War lasted, except for short truce in 1697, until 1713, when it ended with Treaty of Utrecht, whereby Canada, Isle Royal, and St. John's I. remained to France, and Britain obtained Nova Scotia, Newfoundland, and Hudson Bay territory. Formal establishment of Brit. government took place 1719. Period of peace ensued, during which French fortified Cape Breton. After outbreak of war between France and Britain this was taken by British in 1745, but was restored to France in 1748 by Peace of Aix-la-Chapelle. Before long relations again became strained, and in 1755 all Fr. Canadians were expelled from Nova Scotia by Brit. governor, Lawrence. War broke out soon afterwards, and lasted till 1763. French under Montcalm had most success in the first two years, took Oswego and Fort William Henry; but later tide turned in favor of British, who took Louisburg in 1758 and afterwards captured Prince Edward I. In 1759 Quebec fell to Brit. force commanded by Wolfe, who was killed in action; soon afterwards Montreal surrendered; and in 1763 peace was concluded by Treaty of Paris, whereby whole of Canada was ceded to Great Britain and declared Brit. province, Murray becoming governor.

Canada and Nova Scotia did not join in rising of Amer. colonies against mother-country in 1776, and had no share in War of American Independence. In 1791 the Constitutional Act was passed, dividing old prov. of Quebec into Upper and Lower Canada, each with its own governor. Discontent broke out in Lower Canada, and friction between Fr. and Brit. inhabitants. In 1812 occurred war with U.S., which lasted till 1814. In 1837 Fr. rising in Lower Canada was repressed, and in 1841 Upper and Lower Canada were reunited, while Nova Scotia and other maritime provinces still had separate governments. In 1867, by the Brit. North American Act, federal union was formed by Upper and Lower Canada, Nova Scotia, and New Brunswick, as Dominion of Canada, which was joined in 1871 by Brit. Columbia, and in 1873 by Prince Edward I.; Hudson Bay Territory had been acquired in 1869.

In 1869-70, and again in 1885, occurred risings among Fr. half-breeds, causes of which were partly racial, partly religious, the mutineers fearing that the Fr. language and R.C. religion would be superseded; leader was Louis Riel, who after suppression of second

rising was tried and executed. Dispute with the U.S. concerning fishery rights was settled by treaty, 1888, and in 1892 a treaty was arranged between Canada, U.S., and Great Britain concerning sealing in Bering Sea; further disputes on this subject were settled by award in 1897, in which year also occurred the great rush to Klondike consequent on discovery there of gold. In 1896 Manitoba was agitated by religious education disputes which were settled by arrangement; and in this year Laurier became first R.C. premier. In 1898 a conference met at Quebec on question of Alaskan boundary, which was finally defined by treaty with U.S. in 1903. Pacific cable to Australia was completed 1902. New provinces of Alberta and Saskatchewan were created out of N.W. Territories in 1905; in 1912 Ungava was assigned to Quebec, and N.W. Territories S. of 60° N. were divided between Ontario and Manitoba.

The Dominion was formed by confederation between 1867 and 1873 of all the Brit. N. Amer. colonial possessions, except Newfoundland and coast strip of Labrador between Hudson Strait and Gulf of St. Lawrence forming part of that colony. Executive consists of gov.-gen., representing Brit. crown, and privy council; legislature vested in Parliament of two houses, Senate and House of Commons, former having 96 and latter 235 members. Senators are nominated for life by government; Commons elected for five years by popular vote. The nine provinces, Ontario, Quebec, Brit. Columbia, Nova Scotia, New Brunswick, Manitoba, Alberta, Saskatchewan, and Prince Edward I., have each a lieutenant-governor and Parliament, and administer their own local affairs (see FEDERATION). The chief religion is Roman Catholicism, though Methodism, Presbyterianism, and Anglicanism have large followings. Education, which is under provincial control, is free and compulsory, and there are 22 universities, one or more in each prov. (see UNIVERSITIES). Militia service is compulsory between ages of 18 and 60. From time to time proposals have been put forward for the establishment of a Royal Canadian Navy, which will probably be organized in the near future, to guard Atlantic and Pacific coasts.

Inhabitants include Brit., Fr., and other European nationalities, Indians, and Chinese. Immigration continues with great rapidity; in 1912-13, 402,432 settlers arrived, the greatest number of whom came from U.S. and the U.K. There are some 1,600,000 French-speaking Canadians, and over 110,000 Indians. Pop. 7,300,000.

Canada and the World War.—(1)

General. Immediately war was declared Canada placed her whole resources at the disposal of the mother-country. Conscription was introduced in 1917. From first to last she raised over 550,000 troops for active service, of whom 400,000 were sent overseas. Her casualties were 190,000, 44,000 killed or died of wounds. Besides fighting men, she sent munitions, ships, and food to Europe. By 1916 nearly 500 munition factories were in operation, and 62,000,000 shells were sent overseas. Lumber in vast quantities and aeroplanes, 2,500, and aeroplane parts were constructed; 450 m. of railways were torn up and dispatched to France. Increased efforts were made in food production valued at \$187,011,000 in 1914-15, and at \$710,619,400 in 1917-18. She also raised five war loans, and also made advances to Great Britain (mother-country's indebtedness at close of war \$230,000,000). Voluntary organizations of all kinds raised total of \$90,000,000. During war all provinces but Quebec prohibited sale of intoxicants with prohibition general on May 1, 1919.

Naval.—Canada's two war vessels, Niobe, cruiser, 11,000 tons, and Rainbow, light cruiser, 3,600 tons, did useful service in Pacific and Atlantic; fleet of trawlers and drifters sent overseas; 2,000 native Canadians enrolled for naval service; large shipbuilding program undertaken by government—12 submarines, 60 armed trawlers, 100 armed drifters, 550 patrol boats, and special boats for operations on Tigris, as well as supply of similar craft for France and Italy. Forty mercantile steamers of from 3,000 to 10,000 tons were authorized for building; several launched before Armistice.

(2) *Military.*—1st Canadian Div. was sent across in early autumn of 1914; followed by 2nd Div., which arrived in France Sept. 1915; third formed Feb., 1916; fourth, Aug., 1916, by which time Canada had four divisions and a cavalry brigade in Europe. In 1918 total number in France nearly 150,000.

In the following battles Canadian troops won special distinction:

Second Battle of Ypres, April 22, 1915; 1st Div., though gassed and terribly assailed, barred the way to Calais and the Channel ports.

St. Eloi, April, 1916; 2nd Div. bore brunt of operations during long struggle for crater and trench positions.

Sanctuary Wood and Hoge, June 13, 1916; 3rd Div. recaptured Mount Sorrel Observatory by brilliant counter-attack.

First Battle of Somme, Sept. and Dec., 1916: all four divisions took prominent part in taking Courcellette, Sept. 15, and 4th Div. captured Regina trench N. of Courcellette, Dec.

Vimy Ridge, captured by Canadian Corps, April 9, 1917, one of most fruitful successes of the whole war; Hill 70, captured Aug. 15, 1917; Passchendaele, captured Nov. 6. Amlens front: made record advance of 22,000 yards in attack of Aug. 8, 1918.

Arras-Cambrai Battle, begun Aug. 26, 1918: advanced 23 m., fighting for every foot of ground. During this period carried five formidable trench systems, including Drocourt-Quéant switch, Hindenburg Line, and crossed Canal du Nord, casualties in these actions, 30,000. In final stage captured Douai, Valenciennes, Denain, and Mons. In Mons on Armistice Day.

Canada revived with great quickness after the World War, in spite of the immense drain upon her resources during the conflict. The changing relations to the Empire tending toward self-government was greatly advanced and came to embrace all parties including the Conservatives. The last outward sign of imperial authority in Canada, with the exception of the Governor-General, disappeared when the Imperial troops were recalled during the war. An illustration in the change of spirit was the new attitude toward the conferring of titles. In accordance with the wishes of Parliament, titles are no longer conferred upon Canadians. Likewise the appointment of the Governor-General now depends on the recommendation of the Canadian government and not on that of the British government. In 1921 Lord Byng of Vimy was appointed Governor-General. Canada was represented at the conference on the Limitation of Armaments in Washington, in 1921-22, by Sir Robert Borden, former Prime Minister. He took an important part in the deliberations. On the occasion of Lloyd George's appeal, in October, 1922, to the colonial governments to support the Empire in case of war against Turkey, the Canadian government asked for further information before pledging itself to send troops. The industrial conditions improved rapidly in 1921-22. The number of unemployed diminished. Adverse agricultural conditions, however, made it advisable to appoint a committee to inquire into certain features capable of improvement. Immigration to Canada decreased 25 per cent. in 1922, as compared with the same period in 1921. Immigrants from the United States in 1922 numbered 18,982, and in 1921, 21,594.

A further indication of the tendency towards self-government in Canada was the signing, on March 2, 1923, of the first direct treaty between the United States and Canada, made without the mediation of Great Britain. The treaty

CANADIAN RIVER

was signed to secure preservation of the halibut fisheries of the northern Pacific Ocean. It was signed by Secretary Hughes and the Canadian Minister of Marine and Fisheries.

CANADIAN RIVER, a river flowing through Mexico, Texas and Oklahoma. It is a tributary of the Arkansas and has a total length of about 900 miles.

CANAL, an artificial water-course or channel, for purposes of transportation by means of boats and barges. The construction of canals dates back to very ancient civilizations. Many centuries B.C. the Egyptians had made a canal between the Red Sea and the Nile; though this canal was not kept in order or usage continuously. China, a land of many canals, constructed the so-called 'great canal' in the 7th and 9th centuries A.D. The Romans built canals in many parts of the ancient world, amongst these being the earliest known English canal at Cardike. The Witham and the Trent were joined by canal as early as 1134. Canals of more modern times are: the Bridgewater canal in England, begun in 1759, and the Caledonian canal, begun in 1803, but not completed until 1825. The Amsterdam or Great North Holland canal was completed in the same year. In France the Languedoc or Canal du Midi, completed in 1861, is 148 miles long with more than 100 locks and 50 aqueducts, connects the Mediterranean with the Atlantic and is navigable for vessels of upwards of 600 tons. Eight years later, in November, 1869, the Suez canal, also the result of French engineering genius, was opened, connecting the Mediterranean with the Red Sea. It is about 100 miles long and for three-quarters of its length 327 feet wide, with a width of 196 feet for the remaining quarter. The successful construction of the Suez Canal suggested a canal cut through the isthmus joining North and South America. M. de Lesseps, the famous engineer of the Suez Canal, undertook this tremendous enterprise and almost succeeded in carrying it out. But in 1892, when it was comparatively near to completion, it was abandoned as a result of an extensive scandal which involved practically everybody connected with its construction and financing. Many of the most eminent personages including M. de Lesseps, convicted of bribery and misappropriation of funds and the scandal so undermined public confidence that funds for its completion could not be raised.

Amongst canals of even more modern times should be mentioned the great Manchester Ship Canal, connecting the head of navigation of the Mersey river near Liverpool with Man-

CANAL ZONE

chester; the Corinth Ship Canal, across the Isthmus of Corinth, Greece; the great Baltic and North Sea Canal in Germany.

In the United States the earliest canal of importance is the Erie Canal, begun in 1817 and completed in 1825. The great Chicago Drainage Canal was begun in 1892 and completed in 1900. Other important canals in the United States are the Cape Cod Canal (q.v.); a canal connecting the Chicago Drainage Canal with the Illinois river; the Sault Ste. Marie Canal in Michigan; the Chesapeake and Ohio Canal, 185 miles long, from Washington, D. C., to Cumberland, Md., built at a cost of more than \$11,000,000; the Florida Coast Line Canal, from Mayport, Fla., to Miami, Fla., 370 miles long and built at a cost of \$3,500,000; the Hennepin Canal, from the Illinois to the Mississippi near Rock Island, Ill., 75 miles long and built at a cost of over \$7,000,000; the Illinois and Michigan Canal, from Chicago to La Salle, Ill., 96 miles long and costing over \$6,000,000; the New Jersey Coastal Inland Waterway, from Cape May to Bay Head, N. J., 114 miles long; the New York Barge Canal (q.v.); the Miami and Erie Canal, from Cincinnati to Toledo, O., 274 miles long and costing over \$8,000,000; the Pennsylvania Canal, from Columbia to Wilkes-Barre and Northumberland, Pa., 193 miles long and costing about \$8,000,000. The most stupendous canal ever constructed, of course, not only in the United States but anywhere in the world is the Panama Canal (q.v.). The world wide economic depression, following the end of the World War, found expression in respect to canals, in an almost complete cessation of new construction. However, during 1922 the U.S. government purchased the old Chesapeake and Delaware canal, connecting the Delaware river and Chesapeake bay between Delaware City and Chesapeake City, and began work on its enlargement. The Suez Canal, too, was deepened and enlarged as a result of experiences had during the World War.

CANALE, ANTONIO, CANALETTO (1697-1768), Ital. artist; National Gallery, London, contains examples of his work.

CANAL ZONE, strip of land, 47 m. long by 10 m. wide, on either side of the Panama Canal from the Atlantic to the Pacific Ocean; bought from Panama, 1904, by U.S. for \$10,000,000 and annual rental of \$250,000. By Panama Act government of zone vested in several departments all under direction of a governor; first governor, Col. G. W. Goethals, builder of the canal. U.S.

have drained swamps, dealt with sewage, and effectively screened all government buildings from mosquitoes, and by so doing have so greatly reduced malaria and other diseases that health rate of zone compares favorably with that of U.S.

CANANDAIGUA, a village of New York, the county seat of Ontario co. It is on the New York Central and Pennsylvania railroad, and is on the northern end of Canandaigua Lake, 29 miles east of Rochester. The village is on an elevation and commands a fine view of the lake. It has many handsome private residences and churches. Its institutions include Canandaigua Academy, private and public schools, Ontario Orphan Asylum, an insane asylum, Catholic orphanage, banks, etc. It has also industries of importance. Pop. 1920, 7,356.

CANANDAIGUA LAKE, a lake in the western part of New York state, 668 feet above the sea and 437 feet above Lake Ontario, with an extreme length of 15 miles and a width of one mile. It lies mostly in Ontario county. The principal settlement on its shores is the village of Canandaigua.

CAÑAR (c. 3° S., 78° 30' W.), province, Ecuador; silver. Pop. 64,000.

CANARY ISLANDS (27° 45' to 29° 15' N., 13° 30' to 18° W.), group of volcanic islands, belonging to Spain, off N.W. coast of Africa, 62 miles from mainland. There are seven large islands, La Palma, Hierro, Gomera, Tenerife, Grand Canary, Fuerteventura, Lanzarote; area, c. 2,808 sq. miles. Climate is delightful; lowest temperature, 48°, highest, 95° F.; rainfall moderate. Islands produce onions, fruits, bananas, etc., cochineal, wine, tobacco, vegetables; all exported. Imports include cottons, woolens, coal, flour, machinery, timber, hardware, etc. Chief town is Las Palmas, Grand Canary. Great conical peak of Tenerife, 12,198 ft., is visible 140 miles off. C. Islands discovered by European explorers in XIV. cent.; were then inhabited by Berber people. Various Spanish expeditions were sent from time to time, whole archipelago being ultimately annexed by Spain. Pop. 420,000.

CANBY, HENRY SEIDEL (1878), American editor and educator. Ph.B. Yale, 1899; Ph.D., 1905. Professor since 1908 in the Sheffield Scientific School. Editor Literary Review of New York Evening Post since 1920. Was connected with British Ministry in Information from Jan. to Aug., 1918. Member of League of American Authors. Author of *The Short Story*, 1902; *The Short Story in English*, 1909; *A Study of*

the Short Story, 1913; *College Sons and College Fathers*, 1915; *Our House*, 1919; *Everyday Americans*, 1920.

CANCER, a disease characterized by a morbid growth in the bodily tissue, appearing usually as a tumor, which may be of very rapid growth, or develop slowly, during a period of several years. Cancer is, in fact, a species of tumor, distinguishable from a harmless growth, or tumor, more by its results than by diagnosis. Even after it has been excised from the body of the sufferer and subjected to microscopic examination, the most skilled anatomist may remain uncertain as to the malignant character of the growth. There is probably no wide-spread disease which is the subject of so much controversy within the medical profession as cancer. On these points there is a fair measure of agreement; it is not of bacterial origin; it is not contagious; and it is not inherited. Its cause and cure are the subject of violent disputes. Until quite recently it was generally believed that a blow, or more especially, a local irritation, such as might be caused by a jagged pipe stem on the tongue, could produce a cancer. The intelligent medical practitioner now realizes that while a cancer may appear at a point that has been subjected to local irritation, there must be predisposing physical causes, or conditions. Investigations of the past few years have shown certain facts on which at least a plausible theory may be founded. It has been found that there is a certain relation between prosperity and the growth of the cancer death rate; that where people suffer less from malnutrition and are more comfortably housed, there cancer increases; that it develops less among people living under primitive conditions. Many advanced medical men therefore contend that cancer is largely the result of the abuse of the body through over-nutrition. Dr. Pauchet, a French surgeon, reports that he has found a distinct relation between constipation and cancer; that patients showing the first symptoms of possible cancer, invariably suffer from constipation, and that where the constipation has been rectified by means of diet, the cancer symptoms have disappeared. There is, at any rate, a growing belief that the removal of a malignant growth by surgical means is not a cure, and that inevitably the disease will manifest itself again, many even contending that an operation only hastens the final fatal result. Among a growing number of modern medical men there is a firm belief that cancer, if not too far advanced may be cured by diet, and that it may most

assuredly be prevented by that means. The most prominent American advocate of that means of cure, and the pioneer in that field in this country, is Dr. L. D. Bukley, the founder of the New York Skin and Cancer Hospital. Dr. Bukley established a special ward in his hospital where cancer patients were treated entirely by dietetics. In 1922 this ward was closed and Dr. Bukley resigned from his position on the hospital staff, on account of a dispute with his younger associates. It was not contended, however, that his method was a failure, but that patients in the advanced stages of the disease, too developed to be saved by dietetics, would nevertheless refuse to undergo operations, their only hope of escaping a fatal termination of the disease.

CANCER, a northern (and the 4th zodiacal) constellation, chiefly noted for containing the cluster *Prosepe* (or the 'Beehive'), which, next to the Pleiades, is the most conspicuous star cluster in the heavens.

CANDEE, HELEN CHURCHILL, American writer. Was educated at various private schools in New Haven and Norwalk, Conn. Author of *Susan Truslow*, 1900; *An Oklahoma Romance*, 1901; *Decorative Styles and Periods*, 1906; *The Tapestry Book*, 1912. Also a frequent contributor of stories and essays for leading magazines.

CANDELABRUM, originally a stand on which lamps were placed; oldest known is the bronze one to bear the Minerva lamp at the Erechtheum, Athens; term now often applied to a collection of hanging lights.

CANDIA (35° 20' N., 25° 9' E.).—(1) old name for Crete (*q.v.*). (2) seaport city, Crete; formerly capital; oil and soap. Pop. 25,000.

CANDLE, rod of tallow, wax, or like matter surrounding a wick, and used for lighting purposes; tallow seems to have been the earliest substance used, and c's made from it are mentioned by Apuleius; wax c's were used by the Romans; in the Middle Ages, both in London and Paris, the business of c.-making gave rise to two distinct guilds—the Wax chandlers and the Tallow chandlers.

CANDLEMAS, festival held Feb. 2 to commemorate the Presentation of Christ in the Temple and the Purification of the Blessed Virgin. In the R.C. Church it has been the custom at Mass to bless the candles on that day for use during the whole year.

CANDLER, ASA G. (1851), an

American capitalist, born in Carrol co., Ga. He was educated in the common schools and for several years was engaged in the drug business, in which he accumulated a large fortune. He organized the Central Bank and Trust Corporation of Atlanta, and was interested in other large financial institutions in that city. He was the president of a company which manufactured a drink of great popularity. He contributed largely to several colleges and other institutions. This includes a gift of \$1,000,000 to Emory College. He gave also largely to several Methodist institutions.

CANDLER, WARREN A. (1857), American bishop. Graduated from Emory College in 1875; D.D., 1888; L.L.D., 1897. Was made President of Emory College in 1888 and remained in that position until 1898 when he was elected bishop of the Methodist Episcopal Church of the South. Author of *History of Sunday Schools*, 1880; *Christus Auctor*, 1899; and *Great Revivals and the Republic*, 1905. Also *Practical Studies in the Fourth Gospel*.

CANDLISH, ROBERT SMITH (1806-73), Scot. theologian; minister of St. George's, Edinburgh; occupied chair of divinity at New College, and was some time principal; one of leaders of the party which, after 1843 Disruption, became known as the Free Church of Scotland.

CANDOLLE, AUGUSTIN PYRAME DE (1778-1841), Swiss botanist; b. Geneva; prof. of Bot., Montpellier, 1810, and Nat. Hist., Paris, 1816; promulgated natural system of plant classification.

CANDON (17° 7' N., 120° 28' E.), town, Luzon, Philippine Islands; rice, tobacco, indigo grown; cotton, silk, etc., manufactured. Pop. 20,000.

CANDY. See **KANDY**.

CANEA (35° 30' N., 24° E.), fortified seaport, capital, 1841, and chief commercial town of Crete; small but good harbor; exports soap, oil, and wax; ancient *Cydonia*. Pop. 25,000.

CANELONES (34° 29' S., 56° 8' W.), department, Uruguay; area, 1,833 sq. miles. Pop. 92,000.

CANEPHORUS (Gr. *anephoros*, basket-carrier), Gk. woman who carried the elements of religious sacrifices; seen in sculptured reliefs.

CANFIELD, DOROTHY (1879), American writer. Graduated from Ohio State University, 1899; Ph.D., Columbia, 1904; D. Litt., Middlebury College, Vt., 1912. Secretary of Horace Mann School 1902-5. Author of *Corneille and Racine in England*, 1904; *What Shall*

We Do Now?, 1906; *The Squirrel Cage*, 1912; *The Montessori Mother*, 1913; *Hillsboro People*, 1915; *Fellow-Captains*, 1916; *The Brimming Cup*, 1921; *Certain People of Importance*, 1922. Was in France three years doing war work.

CANGAS DE TINEO (43° 14' N., 6° 32' W.), town, Oviedo, Spain; woolen goods. Pop. 25,000.

CANICATTI (37° 20' N., 13° 52' E.), town, Sicily; sulphur. Pop. 25,000.

CANICULA, see **CANIS MAJOR** for *Sirius*, the dog-star; Canicular days, the *dog-days*, days in hottest period of year when *Sirius* used to rise just before sun; but this conjunction does not, owing to precession of the equinoxes, now come in dog-days.

CANIS MAJOR (Lat. 'Greater Dog'), constellation visible in S. sky during winter; supposed to be one of the dogs of Orion the Huntsman, the other being *Canis Minor*. C.M. is chiefly remarkable because it contains *Sirius*, the dog-star, the brightest star visible from the northern hemisphere, whose distance is calculated to be about 47 billions of miles.

CANKER WORMS, caterpillars of two species of Geometer Moths (*Anisopteryx*), which do much harm to the leaves of fruit and other trees.

CANNA (57° 5' N., 6° 30' W.), island, Hebrides, Scotland.

CANNÆ (41° 18' N., 16° 7' E.), ancient town, Apulia, Italy; here Hannibal defeated Romans with great loss, 216 B.C.

CANNANORE, KANANORE (11° 51' N., 75° 25' E.), seaport, Madras, India; headquarters of military division. Pop. 28,000.

CANNES (43° 32' N., 6° 56' E.), watering-place, Alpes-Maritimes, France; salubrious climate; fashionable winter resort; has extensive flower farms for distillation of perfumes. An important Economic Conference was held here by the great European powers in 1922. Pop. 30,000.

CANNIBALISM, ANTHROPOPHAGY, custom of eating human flesh; held by some writers to have been habit of primitive man, but on this point there is much divergence of opinion. So advanced a race as the Aztecs of Mexico were addicted to c.; and in modern times the New Guineans, the Battas of Sumatra, and the Maoris of New Zealand were much given to the practice. In the Polynesian Islands the custom was rampant, but has been practically stamped out by the efforts of missionaries.

CANNING, CHARLES JOHN, EARL (1812-62), Brit. statesman; Conservative member for Warwick, 1836; Under-Sec. for Foreign Affairs, 1841; Postmaster-General, 1853; Gov.-Gen. of India, 1856, during period of mutiny.

CANNING, GEORGE (1770-1827), Eng. statesman, whose f. claimed descent from the famous Bristol merchant, William Canynge; ed. Eton and Oxford; entered Parliament as member for Newport, I. of W. 1794; Under-Sec. of State, 1796; made reputation as orator, 1798, by his speeches in support of abolition of slave trade; Treasurer of Navy, 1804; Minister of Foreign Affairs, 1807; Ambassador to Lisbon, 1814; Pres. of Board of Control, 1816; Prime Minister, in succession to Lord Liverpool, 1827; one of the most brilliant and witty orators of his time.

CANNOCK (52° 42' N., 2° 2' W.), market town, Staffordshire, England; coal-fields. Pop. 28,000.

CANNON, name now almost obsolete, but used until recent times for heavy ordnance; during XVI. cent. name was only applied to largest pieces of field artillery, of which the Cannon-Royal was chief.

CANNON, ANNIE JUMP (1863), astronomer, was born at Dover, Del. and educated at Wellesley College. After special work in astronomy at Radcliffe College, she became curator of astronomical photographs at Harvard College Observatory. In the course of her photographic work, she has discovered 150 variable stars and 3 new stars. She is the author of many of the Harvard College Observatory Annals.

CANNON, JAMES, JR. (1864), Amer. bishop. Graduated from Randolph-Mason College in 1884; B.D. Princeton Theological Seminary, 1888, and A.M. Princeton University, 1889. Entered the ministry in the Virginia Conference of the Methodist Episcopal Church of the South at Portsmouth, Va. in 1888 and was ordained an elder in 1892. D.D. Randolph-Macon, 1903. Elected bishop of M.E. Ch., S., 1918. Was President of Blackstone College for Girls from 1914-18 and was U.S. delegate to the International Conference on Alcoholism, at Milan, 1903; Washington, D.C., 1920 and Lausanne, Switzerland in 1921.

CANNON, JOSEPH GURNEY (1836), an American statesman; b. Guilford, N.C. He was admitted to the Illinois bar in 1858. From 1861 to 1868 he was State attorney for the 27th Judicial District of Illinois. He was

first elected to Congress in 1872 and served in the 43rd to 51st, 53rd to 62nd, and 64th to 67th Congresses, 1873-91, 1893-1903, 1915-1923. He was chairman of the Committee on Appropriations in the 51st, 55th, 56th, and 57th Congresses and Speaker of the United States House of Representatives in the 58th, 59th, 60th, and 61st Congresses, 1903-11. At the Republican National Convention, held in Chicago in 1908, he received 58 votes for the presidential nomination. During his period of service he was one of the outstanding political figures of the country and took an important part in the framing of much of the legislation passed by the House. He is a frequent contributor to magazines on political subjects. He announced his voluntary retirement from political life in 1922 when he refused to stand for re-election.

CANNSTATT, KANNSTATT (48° 47' N., 9° 14' E.), town, Württemberg, Germany; has warm mineral springs; iron and cotton industries. * Pop. 33,000.

CANOE, name, of Carib origin, for light boat pointed at each end. The early British c's were 'dug-outs,' and made from single trees. The N. Amer. Indians' c. is made of a frame of light wood, covered with birch-bark, stitched with fibre, and gummed; other c's have been made with canvas outer cover.

CANON, church dignitary, holding prebend in a cathedral, the presentation being usually vested in the crown, abp., or bp. There are also honorary c's, who receive no revenue from the chapter's fund; and minor c's, who are required chiefly to sing the cathedral service. During the monastic period in England the c's lived together in religious houses. One such order was the Canons Regular, or Augustinian Canons.

CANON, deep gorge cut out by river. Most famous is that of Colorado River, U.S.A.

CANON, in music, composition in which the parts take up melody in succession; decision of Church Councils (see CANON LAW); ecclesiastical payment; rule of logic.

CANONIZATION. See SAINT.

CANON LAW, body of ecclesiastical law, the canon being a decision of an ecclesiastical council or synod confirmed by the pope or the sovereign power in a state. The early C.L. of R.C. Church, the *jus antiquum*, was composed of the so-called Apostolical Canons, the canons of the Fathers of the Church, of the seven universally recognized oecumenical councils, and of the chief synods. The

first collections, made IX.-XII. cent., were followed by the *Decretum Gratiani*, pub. 1144, a private collection, a true copy of other decrees, encyclical letters, etc. It was written by the Benedictine monk Gratian as a *Concordia discordantium canonum*, which obtained papal approval though not official acceptance. It circulated the Donation of Constantine and the rest of the False Decretals. The expression *jus canonicum* is first found at this time.

The decretals from the time of Gratian to the last decade of the XII. cent. were collected by Bernardo Circa, bp. of Faenza, but the *jus novum* or *corpus canonicum* begins with the Decretals of Pope Gregory IX. c. 1233, five books drawn up by his chaplain, the Dominican, St. Raymond of Pennafort (b. c. 1175), with papal sanction. There followed a sixth book of Decretals, *Sextus Decretalium*, or the *Sext*, drawn up, 1298, under Boniface VIII.; the *Constitutiones Clementinae*, pub. by Pope Clement V. at the Council of Vienna, 1308, and by John XXII., 1317, the latter adding chapters known as *Extravagantes*. *Extravagantes Communes* emanated from succeeding pontiffs before the XVI. cent. and are included in the *Corpus* as appendices. The decrees of the Council of Trent and later c's stand outside the *Corpus* and are known as *jus novissimum*, by which the C.L. has been greatly modified.

CANONESS, an order instituted VIII. cent. of female devotees living together in religious houses. They took vows of obedience and chastity, but the rules were somewhat less strict than those of nuns.

CANONS, BOOK OF, book of injunctions for the Scot. Church drawn up by Scot. bp's, 1636, under Anglican influence; caused Presbyterian discontent.

CANOPY, covering, such as that borne over crowned heads; in arch., the carved stone projections over tombs or monuments.

CANOSA (41° 13' N., 16° 4' E.), town, S. Italy; cathedral; occupies site of ancient *Canusium*, one of chief commercial towns of Italy.

CANOSSA (44° 34' N., 10° 27' E.), village, Italy; the ancient ruined castle is scene of Emperor Henry IV.'s humiliation before Pope Gregory VII. in 1077.

CANOVA, ANTONIO (1757-1822), Ital. sculptor; b. Passagno, near Venice; ancestors for several generations had been stone-cutters. At age of eight he executed two marble shrines, and displayed such remarkable promise that he

CANOVAS DEL CASTILLO

was taken under the patronage of a Venetian senator, Falleri, who placed him in the care of Torretto, a well-known sculptor, with whom he remained several years. In 1779 C. went to Rome and found a new patron in the Venetian ambassador, Zullano. Here, amongst other works, he produced his great statues of 'Apollo,' 'Theseus vanquishing the Minotaur,' 'Cupid and Psyche,' and the colossal cenotaph to Clement VIII. C.'s fame was now well established throughout Europe, and wealth and honors were thrust upon him. Judged by the severe standard of the ancients the work of C. is marked by a certain amount of artificiality, but this very defect, if such it be, was the chief factor in his success. His personal character exhibited many attractive qualities, and the vast sums he acquired by his art were chiefly expended in acts of benevolence.

CANOVAS DEL CASTILLO, ANTONIO (1828-97), Span. statesman; filled many offices of state, and became Premier, 1874; in earlier life pub. hist. novel, *Las Campanas de Huesca*; assassinated by an anarchist.

CANROBERT, FRANÇOIS CERTAİN (1809-95), Fr. marshal; saw much foreign service in early life; commanded division at *Alma*, and was present at *Inkerman* and *Sevastopol*; commanded 4th army corps in Franco-Ger. War, distinguishing himself at *Gravelotte*.

CANSO, GUT OF (45° 35' N., 61° 20' W.), channel, between Cape Breton Island and Nova Scotia.

CANTABILE, in music, evenly and at moderate pace.

CANTABRI, pre-Aryan race of N. Spain; found 25 B.C., when they fought with Romans.

CANTABRIAN MOUNTAINS (43° N., 6° W.), in N. of Spain, extending eastwards from Pyrenees to Atlantic coast; highest peak, Peña Vieja, 8,745 ft.; forests; rich coal-fields.

CANTACUZENE, PRINCESS COUNTESS SPERANSKY (1876), daughter of Major General Frederick D. and Ida Honore Grant. Granddaughter of Gen. U.S. Grant. Was the author of *Revolutionary Days*, 1919; *Russian People*, 1920, and *My Life Here and There*, 1921. Wrote extensively on European conditions after the World War for leading magazines.

CANTACUZINO, celebrated Rumanian family of noble Byzantine origin, of which George C., b. 1837, is the descendant; Prime Minister 1905-7.

CANTERBURY

CANTAL (45° N., 3° E.), department, Central France, formed from S. part of old province Auvergne; surface mountainous; center occupied by volcanic group, highest point, Plomb du C. c. 6093 ft.; chief rivers, Alagon, Truyère, and Cère; numerous hot mineral springs; rich pasturage for cattle-rearing; coal and antimony found; butter and cheese made; area, 2,231 sq. miles. Pop. 225,000.

CANTATA (Ital.), story with musical setting, usually opening with chorus, followed by arias and recitatives, and ending with a chorale; examples by Bach, Carissimi, Mendelssohn, Weber, Brahms, and others.

CANTEEN, a soldier's water flask. It is made of metal and covered with a durable woven fabric. Its capacity is from two to three pints.

In its wider meaning the term is used as an equivalent to Post Exchange, an institution established at every U.S. army post. It serves as a club for enlisted men and as a co-operative store for all military inhabitants of a post, furnishes groceries and other articles at the lowest cost consistent with quality. It is run under special regulations issued by the War Department and is managed by a commissioned officer who is especially detailed for this purpose. The building is furnished by the government and frequently contains a gymnasium and reading room. Beginning with 1901 the sale of beer and wine was prohibited by law, though even before that spirits were prohibited. Until the enactment of prohibition by means of the 18th amendment to the Constitution annual efforts were made to repeal the anti-canteen law, all of which, however, were unsuccessful. During the World War the term was frequently employed to designate stores, restaurants, and recreation huts established at the front by the Y.M.C.A. and similar organizations.

CANTERBURY (51° 16' N., 1° 4' E.), town, on Stour, Kent, England; archiepiscopal and metropolitical see, abp. being primate of all England, owing to Augustine's settling in C., the capital of Æthelbert's kingdom; long a place of pilgrimage (cf. Chaucer's *Canterbury Tales*). Magnificent cathedral shows all architectural styles from Early Norman to Perpendicular; founded as Christchurch by St. Augustine, late VI. cent.; several times injured by Danes; enlarged and rebuilt at various dates; burnt in 1067; present building begun by Lanfranc, 1070; choir burned, 1174; restoration supervised by William de Sens; completed in present form by 1495; has crypt with vaulted roof, which contained

CANTERBURY

tomb of St. Thomas and was used as place of worship by Huguenot refugees in XVI. cent.; consists of nave, choir, central and choir transepts with chapels, presbytery with apsidal chapels, eastern ambulatory, main apsidal chapel, Becket's tower, central and two western towers, south porch; has gorgeous shrine of Thomas Becket; some beautiful old stained glass; buildings attached to cathedral are deanery, chapter-house, baptistery, treasury, cloisters. C. has also some old churches; manufactures damask. Pop. 24,000.

CANTERBURY (43° 47' S., 40° 45' E.), district, New Zealand; area, 14,040 sq. miles; cereals, cheese, butter, wool, hides, frozen meat. Pop., not including Maoris, 1921, 199,034.

CANTHARIDEA, SPANISH FLIES, BLISTER BEETLES, iridescent greenish malodorous insects of S. Europe, containing an irritating principle, *cantharidin*; are collected from the branches of lilac, privet, elder, etc., to be used medicinally for raising blisters and as a hair wash, and they act as a violent poison when taken internally. The green color of the insect is due to chlorophyll.

CANTICLES, short songs or hymns, such as the *Benedicite*, *Magnificat*, *Nunc Dimittis*, etc. The name is more particularly applied to the *Song of Solomon* (*Song of Songs*). The title is derived from the first line of the book, "The Song of Songs, which is Solomon's", but it is not to be assumed that the C's were written by Solomon. Rather it is held that the collection was the work of a scribe who had chosen a selection of the songs such as are used to this day in N. Syria during the several days given up to wedding festivities, and, the authorship being unknown, a great name was added, as the Hebrews disliked anonymity.

The earliest opinion held with regard to the character of the book was that it was an allegory dealing with the spiritual marriage between God and His bride, the faithful Israel or, later, the Church. From the days of origin onwards, this was the interpretation put upon the *Song of Songs*. Amongst medieval writers it may be noted that St. Bernard devoted eighty-six sermons to the consideration of this aspect of the work; and, in later times, John Wesley held that the book could not possibly apply to a human love, or physical marriage, but that it must be considered allegorically.

CANTIGNY, BATTLE OF, a battle of the World War, fought on May 28, 1918, at Cantigny, a small town in France,

CANTON

N.W. of Montdidier. Its claim to fame does not rest on its importance, either in respect to the number of troops engaged or in respect to the strategic value of the success gained but on the fact that it initiated the offensive operations of the United States army as a separate organization. The position at Cantigny held by the Germans on May 28, 1918, formed the apex of their thrust against Amiens. Located on a hill, commanding a valley which ran into the American lines and offering valuable advantages for observations, it was still further strengthened by a series of cellars which were linked up by a tunnel and which furnished especially good shelter to the German troops. However, the latter were routed completely within 35 minutes after the Americans had gone over the top at seven in the morning. Tanks, gas, smoke screens, flame throwers, machine guns and the most carefully planned artillery support were employed by our troops who advanced a mile on a two mile front, captured 200 prisoners, killed and wounded many of the enemy, though their own casualties were very small. In spite of repeated and very heavy counter-attacks the American troops successfully consolidated and maintained their newly won positions.

CANTILEVER BRIDGES. See BRIDGES.

CANTILUPE, THOMAS DE, ST. (1218-82). Eng. prelate; Chancellor of England, 1265; bp. of Hereford, 1275; advice much valued by Edward I.; canonized, 1330.

CANTON, heraldic term for rectangular division less than quarter of shield, placed at either corner.

CANTON (23° 12' N., 113° 15' E.), city, China; capital of Kwang-Tung province; port on C. River; surrounded by walls; has inner wall dividing it into old town on N. and new town on S.; great number of natives live in boats; educational center; has two remarkable pagodas, one 1,300, other 1,000 years old, and great number of temples; manufactures silk, hardware, cotton, porcelain, glass, paper, ivory carving, etc.; exports silk, sugar, tobacco, matting, glass bangles, buttons, eggs, tea, cassia, camphor, silverware, etc.; imports opium, paraffin, metals, flour, general goods; taken by British, 1857; held by Brit. and Fr. allies till 1861. Canton was the capital of the Southern Republic in 1921-2. See CHINA. Pop. 1,000,000.

CANTON, a city of Illinois, in Fulton co. It is on the Chicago, Burlington and Quincy, and the Toledo, Peoria and

CANTON

Western railroads. Canton is surrounded by an important agricultural and mining community. Its industries include the manufacture of agricultural implements, cigars, marble, iron, etc. There is a public library, theatres, park, and a hospital. Pop. 1920, 10,928.

CANTON, a town in Massachusetts, in Norfolk co. Within its limits are several villages. It is on the New York, New Haven and Hartford Railroad. Canton is the site of the Massachusetts Hospital School and its public buildings include a library. It has important industries, including the manufacture of woolen and rubber goods, electrical supplies, fire hose, etc. Pop. 1920, 5,945.

CANTON, a city of Ohio, the county seat of Stark co. It is on the Pennsylvania, the Baltimore and Ohio, the Wheeling and Lake Erie railroads, 60 miles south of Cleveland. Surrounding the city is a rich agricultural district. There are also mines of coal, limestone and clay in the vicinity. Its industries are of great importance and include the manufacture of agricultural implements, brick and tile, foundry and machine shop products, iron bridges, steel goods, bank vaults, metal furniture and suction sweepers. The notable buildings include the post-office, public library, auditorium, and hospital. Canton was the home of William McKinley, and a handsome monument to his memory has been erected. Pop. 1920, 87,091; 1924, 100,000.

CANTON, term for division or district, as in France and Switzerland.

CANTON, JOHN (1718-72), Eng. natural philosopher; F.R.S.; made important electrical discoveries.

CANTONMENT, a term used to designate the quarters of troops. It is sometimes almost equivalent to barracks, but is more especially used for temporary quarters when troops, during prolonged military operations, are placed, not in camps or bivouacs, but in nearby villages or cities. See **CANTEEN**.

CANTÙ, CESARE (1804-95), Ital. historian; commissioned by a Turin publisher to write a universal history, he completed it in six years, in 72 vol's; during a term of imprisonment he wrote a novel, his only writing materials being toothpick, candle-smoke, and pieces of rag.

CANUSIUM (41° 13' N., 16° 4' E.), ancient city, Apulia, Italy; became subject to Rome, 318 B.C.; modern Canosa.

CANUTE, THE GREAT, CNUT, KNUT (995-1035), king of England; s. of Sweyn Forkbeard of Denmark. His

CAPE BRETON ISLAND

J. had driven Ethelred the Unready into exile, and had compelled the English to accept him as king, but on the death of Sweyn, 1014, the English restored Ethelred, and Harold, Sweyn's elder s., having been proclaimed king of Denmark, C. became a landless adventurer. He at once made war upon the Eng. king, who died 1016, and continued the struggle against Edmund Ironside, his successor. After C.'s victory at Assandun Edmund agreed to a treaty at Olney, by which he kept the south and C. received the north of the country. Upon Edmund's death, 1017, C. was accepted as king of all England. He became ruler of a small empire in 1028 by succeeding to the thrones of Norway and Denmark, and the popular idea of his greatness illustrated by the tale of his ordering the waves to retire, with the purpose of rebuking his courtiers' flattery. The king of Scotland did him homage, 1031. He ruled England as a native ruler, by Edgar's laws. The four earldoms, Wessex, Mercia, East Anglia, Northumbria, were formed by him, 1017.

CANUTE VI. (1163-1202), king of Denmark; s. of Valdemar I.; did much to extend Dan. territory.

CANVAS, coarse unbleached cloth made from hemp or flax, used for tents, sails, and art purposes; manufacture of Eng. sailcloth began, 1590.

CANZONE, Ital. verse form, of which the chief masters were Petrarch and Leopardi; employed also by Drummond of Hawthornden and Schlegel.

CAP, head-covering; c. of Liberty is the *bonnet phrygien* of the Fr. republic; c. and bells were insignia of the professional fool, and school children formerly had to wear a Fool's c. as punishment; the judge wears a black c. when pronouncing death sentence. C.-à-pie (c. a pied), 'from head to foot.'

CAP HAITIEN (19° 45' N., 72° 14' W.), seaport town, and former capital of Haiti (q.v.), West Indies; exports coffee. Pop. 30,000.

CAPACITY, legal term; an infant, lunatic, or intoxicated person is incapable of making legal agreement.

CAPE, piece of land jutting out into the sea; Cape of Good Hope is called 'The Cape'; short armless outer covering fastening in front.

CAPE BRETON ISLAND (45° 28' to 47° 3' N., 59° 41' to 61° 36' W.), Nova Scotia, Canada; separated from mainland by Gut of Canso; cut in two by Bras d'Or Lake and a ship-canal; length, 100 miles; breadth, 85 miles;

CAPE COAST CASTLE

area, 3,975 sq. miles; produces grain, timber, coal, salt, marble, limestone, granite; important fisheries; shipbuilding; connected with mainland by Intercolonial Railway; first colonized by Fr., 1712; ceded to Britain, 1763. Pop. 125,000.

CAPE COAST CASTLE (5° 15' N., 0° 30' W.), seaport town and fort, Gold Coast, Brit. W. Africa; formerly capital; under Brit. Government since 1843; exports gold-dust, palm-oil. Pop. 11,269.

CAPE COD, hook-shaped peninsula, Massachusetts (42° 5' N., 70° 14' W.); cranberry culture; fishing; summer resorts.

CAPE COD CANAL, a waterway connecting Buzzards Bay and Cape Cod Bay, Mass. It was finished in 1914 and shortens the distance between Vineyard Sound and Boston by about 70 miles, besides eliminating a sea passage full of dangers, due to hidden banks and reefs along the coast and to frequent and severe fogs. Being on sea level, the canal has no locks. It has only a single curve and is lighted by electricity at night. Its depth at mean low water is 25 feet. The entrance is protected by a breakwater 3,000 feet long to prevent filling in. In July, 1918, the canal was taken over by the United States government as a result of attacks made by a German submarine on some coal barges passing through the canal. Additional dredging, undertaken since the completion of the canal, make it available for vessels of 7,000 tons. The Secretaries of War, Navy, and Interior recommended to Congress that the Canal be taken over by the Federal government and placed its fair valuation at \$11,500,000. A bill embodying these recommendations was before Congress in 1923.

CAPE COLONY, see **CAPE OF GOOD HOPE**.

CAPE FEAR RIVER, North Carolina, the largest and most important river within the state, rises in Guilford co., in the northern part, flows southeast 300 miles and empties into the Atlantic near Southport, in the extreme southern part of the state. It is navigable for small steamboats up to Fayetteville, about 150 miles from its mouth. Its lower reaches are bordered by low, swampy lands on which the bulk of the rice crops of the state are grown.

CAPE GIRARDEAU, a city of Missouri, in Cape Girardeau co. It is on the Mississippi River and on several railroads, 150 miles southeast of St. Louis. It has several important educational institutions including St. Vincent's College, and the Southeastern Missouri

CAPE OF GOOD HOPE

State Normal School. There are national banks, newspapers, etc. Pop. 1920, 10,252.

CAPE HORN, a headland on a small island of the Fuegian Archipelago, forming the southernmost point of S. Amer. It was sighted by Drake in 1578, and named by the Dutch in 1616.

CAPE MAY, city in Cape May co., New Jersey, on the Atlantic coast, 80 m. S.E. of Philadelphia. It is a favorite watering-place. It has glass works and canneries of vegetables and fruit. Pop. about 5,000.

CAPE NOME, a cape and center of a very rich gold mining region, on the South shore of Seward Peninsula, Alaska, facing Norton Sound. It is almost on a straight line with the mouth of the Yukon river, but separated from it by about 150 miles of Norton Sound.

CAPE OF GOOD HOPE, PROVINCE OF THE, formerly Cape Colony, part of Brit. Empire forming extreme S. of Brit. S. Africa and of African continent (30° S., 23° E.), bounded N. by S.W. Africa and Bechuanaland protectorates, N.E. by Transvaal, Orange Free State, Basutoland, Natal, S.E. and S. by Southern Ocean, and W. by Atlantic Ocean. Running parallel with coast, and about 150 m. distant from it, is series of mountains known by various names of Drakensberg, Stormberg, Sneeuwberg, Nieuwveld, Roggeveld, and Kamiesberg Mountains, with elevations of 6,000 to 11,000 ft. From coast to these, surface rises by three terraces divided by subsidiary mountain ranges, large part of third terrace being occupied by Great Karroo, a long treeless plateau, with bare table-topped hills, sloping from 4,000 ft. on W. to 3,000 on E., and covered with scrubby karroo bush. The Southern Karroo, or second terrace, resembles Great Karroo, and both have great fertility under irrigation.

Coast terrace and hilly country in E. have grassy plains and woodlands. To N. of great range of mountains surface slopes to valley of Orange River, and plateau of interior beyond. Eastern part of province has rainfall of 25 to 28 in. center, S. coast and Karroo, 9 to 25 in., Great Karroo and country N. and N.W. of it, 9 in. or less. No large river except Orange, which rises in mountains in E. Western districts have winter rains, and eastern summer rains. Mean temperature ranges from 51° to 79° F.

Resources.—Chief source of wealth is diamond mines, center being at Kimberley in Griqualand W.; rich copper deposits in Namaqualand; coal in E., manganese and tin near Cape Town; iron, zinc, lead. Sheep and Angora

goats are reared in large numbers, producing great quantities of wool and mohair; cattle, horses, mules, donkeys bred; lucrative ostrich farming carried on. Maize, millet, wheat, barley are cultivated; grapes, peaches, apricots, nectarines, figs, oranges, olives, pine-apples, bananas, tomatoes, and other fruits and vegetables grown; wine, brandy, and raisins produced; manufactures unimportant; exports include diamonds, wool, mohair, ostrich feathers, copper ore, regulus, and precipitate, raw hides, sheep and goat skins, maize; imports clothing, iron, coal, textiles, leather, carriages, books, furniture, paper, tobacco, grain, hardware, cutlery, tools, provisions, liquors, etc. Irrigation has made rapid strides. Railway mileage is 4,254.

Inhabitants include Dutch, English, and other European nationalities; in western districts are greatest number of Dutch, in eastern of English. The Boers are descended from early Dutch colonists and Huguenot exiles from France. Natives include Bantus, or Kaffirs, Hottentots, Bushmen, Griquas, etc. Many of Bantus are people of fine physique; Hottentots are short, and Bushmen are lowest S. African race. There are also numbers of Indians and Malays, and of 'colored' people, (i.e.,) half-castes. Chief religion of whites is Protestantism (Dutch Reformed Church, Anglican, Presbyterian, etc.). Education is obligatory for European children. Cape Town is provincial capital and seat of Union Parliament. Area, 276,966 sq. m.; pop. 2,601,900, of whom 619,300 are white.

History.—Cape of Good Hope was first discovered by Port. navigator, Bartholomew Diaz, in 1486, and was again doubled by Vasco da Gama in 1497-9. No Port. colonies, however, were established here, and first European nation to make settlement were the Dutch, who in 1652 under van Riebeck established a fort on coast of Table Bay. They used it only as calling station for their ships going to E. Indies.

In 1685 the revocation of the Edict of Nantes had the result of sending about three hundred Huguenots to seek refuge at the Cape. The country was then governed by the Dutch E. India Co., whose rule was so severe that the settlers gradually removed as far as possible into the interior in order to avoid taxation and tyrannical regulations. Many Hottentots were killed and their lands annexed. Dutch control of Cape lasted for nearly a century and a half. In 1780, however, Britain, having declared war against Holland, who was allied with France, arranged to send fleet against Cape; this was carried

out next year, when the British were defeated by a Fr. fleet before reaching their destination. Fifteen years later the British made another and successful invasion and captured Cape in 1795; ruled by Britain until 1803, when it was restored to Holland, the Dutch E. India Co. being now superseded by the Batavian republic, who governed for three years; war having again broken out, British once more took Cape Colony 1806, which was formally surrendered to her by treaty in 1814.

The British then began the systematic colonization of country. Several struggles with Kaffirs had already taken place, and for some time hostilities continued, wars breaking out from time to time. Ultimately the Kaffirs were defeated by Sir Harry Smith, and peace was concluded in 1835. Meantime all slaves had been emancipated in 1834, which roused discontent among the Boers (Dutch settlers), and in 1835 many of the latter set off on what is called the *Great Trek*, crossed Orange River, and eventually established the Transvaal Republic and Orange Free State. In 1846 occurred another war with Kaffirs, who were defeated by British, and acknowledged that country west of river Kel was British by right of conquest. In 1847 Brit. right to district between Kel and Keiskamma was proclaimed by Sir Harry Smith, new governor. Hostilities again broke out in 1850, and continued till 1853. Meantime great discontent had been caused by Earl Grey's proposal in 1848 to establish a penal settlement at the Cape; agitation was so pronounced that idea was abandoned in 1850; this led to desire on part of colonists for representative government, and in 1854 constitution was established, with two elective chambers, the first Parliament being opened in that year.

Under Sir George Grey, governor 1854-61, various improvements were carried out; he ameliorated the conditions by which land was held by natives, supported missions, and began opening up the country by roads and railways. Brit. Kaffraria was annexed to Cape in 1865, Basutoland in 1871; latter was afterwards taken under direct control of Brit. crown. Griqualand West was also annexed in 1871, and subsequently incorporated with Cape Colony, its diamond mines forming great source of wealth. Discovery of diamonds in various districts resulted in further development of country from 1867 onwards. During administration of Sir Bartle Frere, governor 1877-80, occurred another Kafir war, which was soon suppressed. War in Basutoland in 1880 led ultimately to establishment of that country as crown colony. Walfish Bay

CAPE PENINSULA

was annexed in 1884; Port of St. John's in same year was incorporated with Cape Colony; and in 1885 Tembuland, with Bomvanaland and Gcalekaland, became integral parts of colony. Meantime the first Boer War had occurred in 1881; this resulted in foundation of Afrikander Bond, which aimed at establishing Afrikander nation and removing Brit. control. Pondoland was added to Cape Colony in 1894, and in 1895 occurred the annexation of Brit. Bechuanaaland. Cecil J. Rhodes was prime minister in 1890-6, and had great share in development of colony. In 1899-1902 the great Boer War occurred, and for a time Cape Colony was invaded. Cape Colony was united with Natal, Transvaal, and Orange River Colony in 1910, as the Union of S. Africa; and became the Province of the Cape of Good Hope.

Purely provincial affairs are in hands of Provincial Council, which is subject to the Parliament of the Union of S. Africa. The province sends 51 members to the House of Assembly and 8 members to the Senate. The English and Dutch languages are both official.

CAPE PENINSULA (34° 56' S., 18° 27' E.), peninsula, S. Africa, on N. of which stands Cape Town.

CAPE RACE (46° 40' N., 53° 5' W.), cape, S.E. Newfoundland.

CAPE ST. VINCENT, the southwestern point of Portugal. It is notable for the naval victory won by the British fleet commanded by Sir John Jervis, afterwards Earl of St. Vincent, on February 14, 1797.

CAPE TO CAIRO RAILWAY, promoted by Cecil J. Rhodes; direct distance from Cairo to Cape Town c. 5,700 m. By end of 1910 the railroad from the N. was at Senaar (c. 1,500 m.). From Cape Town the S. African section had been completed to the S. borders of Belgian Congo in Nov. 1909. From this point Belgians have carried the line 324 m. N. via Elizabethville to Tchelongo, total distance from Cape Town, 2,473 m. First through passenger train reached Victoria Falls June 22, 1904. The elimination of Germany as an African power will probably result in the completion of the railway through Brit. territory.

CAPE VERDE (14° 48' N., 17° 33' W.), most westerly cape, Africa, between Gambia and Sengal River.

CAPE VERDE ISLANDS (16° 30' N., 24° W.), group of fourteen islands belonging to Portugal, W. of Cape Verde, off W. African coast; area, 1,480 sq. miles. Largest, Santiago; capital, Praia.

CAPERCAILZIE

Surface is mountainous; generally volcanic, Fogo being composed of single volcano, occasionally active; little water except in ponds and wells; climate hot; rainy season, Aug. to Oct.; vegetation abundant in spite of severe droughts; produce coffee, cinchona, sugar, tobacco, indigo, maize, oranges, grapes, jams, orchil, millet; cattle, pigs, goats, mules and asses raised; salt, amber, turtles; administered by gov., resident at Praia. Inhabitants are Portuguese, negroes, half-breeds. C.V. Islands were discovered in 1456 by Portuguese, who established colony here, 1499; granted to Prince Ferdinand, 1562; long used as penal settlement. Pop. 150,000.

CAPELLA, ALPHA AURIGÆ, first magnitude star in constellation of Auriga; of pearly hue, C. has been found by spectroscope to be a close double star.

CAPELLA, MARTIANUS MINEUS FELIX (fl. V. cent.), author of medieval scientific compendium, *Satyricon*.

CAPELLE, EDWARD VON (1856), under-secretary of Ger. Admiralty, 1913-16; succeeded von Tirpitz as secretary of state for the imperial navy, and held post 1916-18; always an enthusiastic advocate of a larger Ger. navy, he was responsible for the increase of estimates from \$30,000,000 in 1899 to \$115,000,000 in 1913. When Tirpitz fell 1916, he carried on the submarine warfare in the spirit of his predecessor. Under his régime the first naval mutiny broke out at Kiel; the second occurred after his supersession in Sept. 1918.

CAPEN, EDWARD WARREN (1870), sociologist, was born at Jamaica Plain, Mass., and educated at Amherst. He later graduated at Hartford Theological Seminary, and became lecturer on special theological phases at this institution. For several years he was Thompson lecturer on missions, and has been engaged in special sociological and research work in the Far East. He is a member of many sociological and theological bodies, and is the author of numerous pamphlets on missions.

CAPENA, ancient town, Etruria; founded from Veii; afterwards subject to Rome.

CAPERCAILZIE, COCK-OF-THE-WOODS, *Tetrao urogallus*, large species of grouse (q.v.) inhabiting pine woods. The beautifully plumed male is larger than the female, and is noted for its song and fighting proclivities during courtship in spring. The fowl provides sport in Scotland, Sweden, Germany, and Austria.

CAPERNAUM

CAPERNAUM, city of Galilee; home of Christ's manhood; location undecided.

CAPERS, flower-buds of *Capparis spinosa*, plant of bramble tribe, grown in Sicily and Southern France; prepared as pickle.

CAPERS, WILLIAM THEODOTUS (1867), American bishop, graduated from South Carolina College in 1886, Furman University, S.C., 1887 and from the Theological Seminary of Virginia in 1894. M.A., State University of Kentucky, Lexington, 1911. He was ordained a minister of the Protestant Episcopal Church in 1895 and elected bishop of West Texas 1916. Author of several published sermons and addresses.

CAPERTON, WILLIAM BANKS (1855), rear admiral, U.S.N.; b. Tenn. He was educated at Spring Hall, Tenn., Academy and graduated from the U.S. Naval Academy in 1875. Having been made an Ensign in 1877, he was promoted through successive grades to rear admiral, 1913. He saw service at the principal naval stations throughout the world. Amongst various other commands he held that of the U.S. Naval Station, Newport, R.I., 1912-13; Atlantic Reserve Fleet 1913-14; Pacific Fleet, 1916. In 1915-16 he was in charge of pacification of Cape Haitien and later at Vera Cruz. During the World War he was in command of the patrol on the E. coast of South America. He was retired in 1919.

CAPET, 3rd Frankish dynasty, founded by Hugh Capet, 987, who made Paris the Fr. capital. The throne passed to the female line, the house of Valois, in the person of Philip VI., 1328, but the inheritors of the Fr. throne were always considered C.'s, and after the Fr. Revolution Queen Marie Antoinette (q.v.) was addressed as Madame C. The different houses are distinguished as *Capetiens*, 987-1328; *Capetiens Valois*, 1328-1589; *Capetiens Bourbons*, 1589-1848. See FRANCE (History).

CAPE TOWN, mother city of S. Africa (33° 56' S., 18° 28' E), cap. of prov. of Cape of Good Hope, and seat of legislature of Union of S. Africa; beautifully situated on Table Bay, at foot of Table Mountain; many fine suburbs; also excellent harbor and docks. Notable buildings include old Dutch castle, government house, Houses of Parliament, museum, library, several colleges; mosques; observatory; seat of Anglican and R.C. bishops, and of univ.; exports wool, diamonds, ostrich feathers, gold, wine, ivory, hides, skins; imports textiles, hardware, general goods. Inhabitants include Europeans, natives, colored

CAPITAL PUNISHMENT

people (half-castes), Malays, and Indians. Pop. 99,700 whites.

CAPE VERDE ISLANDS, See VERDE, CAPE, ISLANDS.

CAPILLARITY. The particles forming the surface layer are in a condition different from those in the interior of a liquid; this layer is in a state of tension, and its action resembles that of a thin elastic membrane stretched tightly over the surface. In the interior of the liquid, a molecule is subject to attractive forces exerted by all the molecules immediately surrounding it. On the average these forces are in equilibrium and have no sensible effect on the motion of the molecule. But a molecule in, or very close to, the surface is acted on only by forces which attract it downwards. Hence, the free surface of a liquid tends to reduce itself to the least possible area, (e.g.) a raindrop tends to assume the form of a sphere, because a sphere is the form in which a given volume has the least possible superficial area. This tendency of the surface of a liquid to assume the minimum area possible means that it is in a state of tension, and the force acting is termed Surface Tension. It is measured by the number of units of force which it exerts across unit length of a line drawn across the surface of the liquid; (e.g.) the surface tension of pure water is c. 75 dynes per centimetre, or about 3 grains weight per inch.

CAPISTRANO, GIOVANNI DA (1385-1456), Ital. friar who preached crusades against infidels; relieved Belgrade, besieged by Turks, 1456.

CAPITAL is wealth employed to make profit. Its economic functions are to assist the laborer with tools and materials, and to enable the capitalist to accumulate wealth which he can dispose of to his own advantage. Thus the function of c. is not to maintain the laborer, for wages are not paid out of c., but out of the wealth which the laborer has been employed to create. Fixed c. is term applied to wealth not exhausted by the single act of production, (e.g.) railways, machinery, buildings, etc.; circulating c. is term applied to raw material in use for other purposes. Both definitions are unsound though in common use. Capitalism is the commercial system which makes labor dependent on c.

CAPITAL, in architecture, the head of a column, which supports the abacus.

CAPITAL PUNISHMENT, from the Latin *capitis poena*, in jurisprudence the punishment of a criminal act by death. The extreme penalty of death has been

in use for certain offenses even in the remotest times. It is still in use amongst civilized nations as well as in uncivilized countries. In many of the former, however, in recent years considerable agitation against it has been started from time to time. Its frequency, at any rate, has been greatly reduced in modern times, and as far as possible it has been attempted to eliminate from the actual process of inflicting it both cruelty and unusual suffering. In most civilized countries today capital punishment is inflicted only for murder in the first degree and by means of hanging or electrocution. In the United States criminal law is administered by each State in its own territory according to its own laws, and the criminal laws of the several States differ in many respects. However, in general, in most States murder is divided by statute into several degrees, capital punishment is inflicted for first degree murder only, and death by hanging or electrocution is the usual penalty, though in a few States life imprisonment has taken the place of capital punishment.

CAPITO, WOLFGANG (1478-1541), Ger. reformer; was a Benedictine, but, influenced by Luther, became a leader of reformed faith in Strassburg.

CAPITOL.—(1) the citadel of ancient Rome on the summit of one of the Seven Hills, the Capitoline; contained temples of Jupiter, Juno, and Minerva. The present C. was designed by Michael Angelo. (2) seat of U.S.A. National Congress, Washington.

CAPITULARY (*capitulaire*), name given to the laws emanating from the Carolingian kings of the Franks, the most famous being those of Charlemagne and Louis I.; of great importance in history of law and philologically.

CAPITULATIONS, THE, collection of arrangements and treaties confirmation of them concluded at various dates since 1535 between Turkey and the Western powers, under which, up to 1914, the nationals of the latter powers were, save in case of voluntary resort to Turkish courts, exempt, both in civil and criminal matters, from Turkish jurisdiction. The capitulations also extended to Turkish dependencies, even after securing their independence—(e.g.), Rumania, Serbia, and Bulgaria. In Egypt modification of system introduced in 1875, when mixed courts were established to deal with civil cases in which a native, a foreigner, or foreigners of different nationalities, were involved.

CAPIZ (11° 40' N., 122° 50' E.), town and province, N. coast, Panay, Philippine Islands; exports rice, sugar, cotton,

and tobacco. Pop. 14,000. Area, prov., 1,661 sq. miles. Pop. 224,000.

CAPO D'ISTRIA (45° 33' N., 13° 44' E.), fortified town on rocky island, Gulf of Trieste, Austria; cathedral; salt-works. Pop. 8,300.

CAPO D'ISTRIA, GIOVANNI ANTONIO, COUNT (1776-1831), Russ. statesman; b. Corfu; after treaty of Tilsit, 1807, when Ionian republic passed into the hands of Napoleon, he refused offers made by France, and entered service of Russia; elected Pres. of Gk. Republic, 1827; murdered by fanatic tribesmen.

CAPORETTO, vil., Gorz and Gradisca, Italy (46° 15' N., 13° 35' E.), on r. bk. of riv. Isonzo; scene of disaster during World War. Caporetto and its bridge occupied by Italians April 24, 1915, and thereafter was considered a very quiet sector. In autumn of '917 state of Italy alarming; enemy propaganda had made great headway; strikes broke out at Socialist centers, Turin, etc.; number of strikers drafted into army, and with troops which had refused to fire on them were sent to Caporetto sector. Soon entered into communication with enemy; Ger. 14th Army, under Otto von Below, struck on night of Oct. 23 with heavy bombardment of gas-shells along a 25-m. front, with Caporetto as center. Next morning Austro-Ger. infantry attacked; line gave way at the vital spot, Caporetto. Whole regiments surrendered without firing a shot, and result was a disastrous retreat of Ital. army to the Piave. The 2nd Army ceased to exist; the enemy took 200,000 prisoners and 1,800 guns. See WAR, THE WORLD.

CAPPADOCIA (c. 39° 20' N., 36° E.), district in Asia Minor, to W. of Armenia, extending from Taurus to Black Sea. C. was province of Persia, when it included the regions which afterwards became kingdom of Pontus; the remainder was an independent kingdom under Gk. kings for about 300 years, and became a Rom. province after the death of last king, Archelaus, in 17 A.D. It was early converted to Christianity. Chief town was Mazaca, later called Caesarea.

CAPPEL, KAPPEL (47° 13' N., 8° 31' E.), small town, Zürich, Switzerland. R.C. force defeated Protestants, 1731.

CAPPER, ARTHUR, U.S. Senator; b. Garnett, Kan., in 1865. He was educated in the Public Schools of his native town. In 1884 he began his journalistic career with the Topeka, Kan., 'Daily Capital,' serving successively as compos-

itor, reporter, city editor, and Washington correspondent, and, in 1892, became its publisher and proprietor. He also owns and publishes 'Capper's Weekly' and a number of Western Agricultural magazines. From 1915 to 1919 he was Governor of Kansas, being elected U.S. Senator, Republican, in the latter year for the term 1919-25. He is an officer and member of numerous organizations and fraternal bodies.

CAPPS, WASHINGTON LEE (1864), was born at Portsmouth, Va., and educated at the U.S. Naval Academy. He was promoted ensign in 1886 and some years later was promoted to naval constructor. He served on the Tennessee, and later held posts in many naval construction yards. For a time he was on special duty on the staff of Admiral Dewey, when the latter was commander-in-chief of the Asiatic station. In 1913 he was appointed by President Wilson to represent the United States at the International Maritime Conference, and was a delegate representing the navy department at the International Engineering Conference, San Francisco, 1915. General Manager Emergency Fleet Corporation in 1917. President Naval Compensation Board since 1918.

CAPRAIA (43° 2' N., 9° 50' E.), island of volcanic origin, N.W. coast of Italy; belongs to Genoa province; center of anchovy fisheries.

CAPRERA (41° 12' N., 9° 28' E.), island, Strait of Bonifacio, N.E. coast of Sardinia; residence and burialplace of Garibaldi.

CAPRI (40° 32' N., 14° 15' E.), rocky island at entrance to Bay of Naples; ancient *Capree*; area, c. 6 sq. miles; highest point, Mont Solarì, 1,920 ft.; contains two towns, Capri and Anacapri, which till 1876 were separated by a rock-hewn flight of stairs; a road has since been made; W. of Capri is the celebrated 'Blue Grotto' — limestone cavern; Rom. antiquities are found; wine and olives exported. Pop. 7,000.

CAPRIC ACID ($C_{15}H_{22}O_4$), a fatty acid, B.P. 268°C., S.G. 0.911, with odor suggesting goats (*Capree*), found in butter, etc.

CAPRICCIO (Ital. 'caprice'), impressionist musical composition.

CAPRICORNUS, THE GOAT, tenth zodiacal constellation; alpha Capricorn is a third magnitude double star.

CAPRIVI, GEORG LEO VON, COUNT (1831-99), Ger. soldier and statesman; brilliant service before Metz

and in Orleans campaign; app. Chancellor and Foreign Minister, 1890.

CAPSTAN, appliance used on board ship for moving heavy weights, or winding cables. C. works on principle of wheel and axle, consisting in simplest—now obsolete—form, of timber column like truncated cone revolving on a spindle fixed in deck and worked by bars fixed in upper end; now, generally steel or iron, driven by steam or electricity, or replaced by steam winches.

CAPSULE, botanical term for any dry, many-seeded fruit which splits open ultimately to permit the escape of the seeds. This is done in the following ways: (1) by round pores, as in poppies and snapdragon; (2) by teeth at the top, as in campion; (3) by a lid, split off from the top of the capsule, as in pimpernel and plantain; (4) by longitudinal splitting, as in violet, bluebell, iris, and many others.

CAPTAIN, a title of one who is at the head or authority over others. It is especially used to indicate a military officer who commands a company, an officer in the navy who commands a ship of war, and a master of a merchant vessel.

CAPTIVITY, BABYLONIAN. See **BABYLONIAN CAPTIVITY**.

CAPUA (41° 6' N., 14° 12' E.), fortified town, Caserta, Italy; seat of abp.; has cathedral erected IX. cent.; partly built on site of ancient city, Casilinum, traditionally founded by Etruscans and united with Rome c. 340 B.C. Ancient C. was important city in III. cent. B.C., rivalling Rome and Carthage in luxury. During 2nd Punic War C. went over to enemy and was wintered in by Hannibal, 216-15; recaptured by Rome in 211 B.C.; afterwards became favorite resort; ruined by Arabs, 840; ruins include part of large amphitheatre, theatre, baths, and thermæ. Pop. 11,000.

CAPUCHIN, OR SAPAJOU MONKEYS (*Cebus*), a genus of New World monkeys of family Cebidæ; found from Central America to south of Brazil, and often in menageries.

CAPUCHIN FRIARS (from *capuche*, cowl), an offshoot from the Franciscans, officially styled 'Friars Minor of the Order of St. Francis, Capuchin', founded in early part of XVI. cent. by Matteo di Bassi, who adopted a pyramidal hood, grew a beard, went barefoot, and generally reverted to a more rigid system of living than was then observed by the Franciscans. The religious authorities attempted to suppress these innovations, but they were eventually ratified by Clement VII, 1528. The

Capuchins wear a brown habit, and are still a flourishing body in many parts of the world.

CAPULETS AND MONTAGUES, Veronese families unknown to history. Their story as told in Shakespeare's *Romeo and Juliet* is taken from Bandello, whose account of the Cappelletti and Montecchi was trans. into Eng. verse, 1562, by Brooke.

CAPUS, ALFRED (1858), Fr. novelist, playwright, and essayist; member of Fr. Academy, 1914; wrote *Les Mœurs du Temps*, 1912; collection of articles on social topics; plays, *Les Maris de Léontine*; *L'Oiseau Blessé*, *L'Attentat*, *Marriage Bourgeois*, pub. in 7 vols, 1910-11.

CAPUT MORTUUM (Lat. 'dead head'), name given by early chemists to residue of substance after escape of all gases; later, spiritless object.

CAR NICOBAR (9° 21' N., 92° 56' E.), one of Nicobar Islands, Bay of Bengal.

CARABIDEA, OR ADEPHAGA, a suborder of beetles, distinguished by their five-jointed tarsi, their filiform antennae, and their carnivorous habits. They are speedy of movement and have well-developed jaws. Amongst them are the huge and beautiful Ground Beetles (*Carabidae*), including the Bombardier (*Brachinus*), so called because when irritated it ejects an unpleasant fluid which, immediately volatilizing, resembles a puff of smoke; Tiger Beetles (*Cicindelidae*), found all the world over, which run down their insect prey by speed of foot; Carnivorous Water-Beetles (*Dytiscidae*), with flattened, oar-like hind-legs, common in most ponds and ditches.

CARABINEERS, CARBINEERS, name, of Fr. derivation, originally borne by the 6th Dragoon Guards, armed with carbine, 1692, and known as 'the King's Carabineers.'

CARABOBO (10° 10' N., 67° 30' W.), state, Venezuela, S. America, bordering on Caribbean Sea; fertile soil; produces coffee, fruit, sugar, and maize; capital, Valencia. Area, 1,794 sq. miles. Pop. 170,000.

CARACAL (44° 8' N., 24° 21' E.), town, Rumania. Pop. 12,000.

CARACALLA, MARCUS AURELIUS ANTONINUS (186-217), Rom. emperor; s. of Septimius Severus; noted for his cruelties and extravagance; made war on Dacian Goths and the Alamanni; built arch of S. Severus in forum.

CARACAS (10° 31' N., 67° 5' W.), city, capital of Venezuela, built on S. slope of Avila, surrounded by moun-

tains by which it is separated from its port, La Guira, 6 miles N.; healthy climate; abp.'s seat; has a cathedral and univ.; subject to earthquakes; center of export trade in cacao and coffee. Pop. 92,000.

CARACCIOLI, Neapolitan family, prominent XV. cent. onwards. Prince Francesco C., 1752-99 was admiral of the Parthenopelian Republic.

CARACCILO, FRANCESCO, PRINCE (1732-99), Neapolitan admiral; learned seamanship under Rodney and Hotham; became commander of Ferdinand IV.'s navy; later turned revolutionist, fell into hands of Nelson, condemned aboard Foudroyant, and hanged from yardarm of Minerva.

CARACTACUS (c. 48-51 A.D.), Brit. chieftain who held Roman invaders at bay, but was later taken prisoner and sent to Rome.

CARADOC SERIES, geological term; series of sandstones, shales, and grits, thickness 4,000 ft.; subdivision of Lower Silurian system occurring in Shropshire.

CARAFFA, ANTONIO (1539-19), cardinal; prominent at Council of Trent.

CARAFFA, GIOVANNI PIETRO (1476-1559), of noble Neapolitan family, became Pope Paul IV., 1555, quarrelled with Philip II. of Spain for tolerance of Protestants, and afforded a glaring example of nepotism.

CARALES (39° 8' N., 9° 5' E.), ancient town, S. Sardinia; modern Cagliari; has remains of Rom. amphitheatre, baths, aqueduct; Carthaginian-Rom. necropolis with Rom. and Punic rock tombs; founded by Phoenicians; became stronghold of Carthaginians; taken by Romans, III. cent. B.C.; conquered by Goths, V. cent. A.D., by Saracens, VIII. cent.

CARAMEL, substance formed when sugar is heated to 212°.

CARAN D'ACHE (1858-1909), pseudonym of Emmanuel Poiré, Fr. caricaturist and book illustrator.

CARAPACE, a protecting shell, as that of crabs, of *Limulus* (the King Crab), of tortoises, or of armadillo.

CARAPEQUA (25° 56' S., 57° W.), town, Paraguay, S. America; cotton, sugar-cane, and tobacco chief products. Pop. 15,000.

CARAT.—(1) weight of 4 grains troy, used in weighing precious stones. (2) $\frac{1}{4}$ th part of any weight of gold alloy; an object said to be 18 c. gold, contains 18 parts pure gold to 6 parts alloy.

CARAUSIUS, MARCUS AURELIUS (250-293 A.D.), native of Belgic Gaul who entered Rom. service, and finally set up as independent ruler in Britain.

CARAVACA (38° 4' N., 1° 53' W.), town, Murcia, Spain; celebrated for sacred cross with marvelous healing power, which is preserved in church; has ruined castle; ironworks. Pop. 16,000.

CARAVAGGIO, MICHELANGELO AMERIGHIDA (1569-1609), Ital. artist; b. Caravaggio; treated religious subjects with coarse realism.

CARAVAGGIO, POLIDORO CALDARA DA (1492-1543), Ital. artist; friezes in Vatican.

CARAVAN, band of traders traveling together on camels for mutual protection against predatory Bedouins and others; number of camels from about 30 to 1,000; file is often preceded by an unladen ass, and first camel is gaily decorated.

CARAVANSERAI, public quadrangular building, for shelter of caravans and travelers generally, in parts of Asia; central court, with fountain, is open to the sky; entered by single large gateway, protected by strong doors and chains.

CARAVEL OR CARVEL, name of the 'great ships,' with high castellated sterns, used by Spaniards and Portuguese in XV. and XVI. cents.

CARAVELLAS (17° 40' S., 39° 14' W.), seaport town, state of Bahia, Brazil; exports coffee, cocoa-nuts, and fish oil. Pop. 4,000.

CARAWAY, THADDEUS H. (1871), United States Senator. Graduated from Dixon College, Tennessee, in 1896, and was admitted to the Arkansas bar in 1900. Elected prosecuting attorney of the 2nd Judicial Circuit of Arkansas and served two terms, 1908-12. Was a member of the 63d-66th Congresses from 1913-21, first Arkansas District. United States Senator from Arkansas, 1921-7.

CARBELLO (43° 14' N., 8° 43' W.), town, Corunna, Spain; hot sulphur springs in district. Pop. 13,000.

CARBERRY HILL, ridge c. 7 miles S.E. of Edinburgh; occupied by Eng. left wing before battle of Pinkie, 1547; scene of surrender of Mary, Queen of Scots, to nobles before her imprisonment at Lochleven, 1567.

CARBIDE, carbon and metal compound; calcium c. and lithium c. generate acetylene gas used for lighting purposes.

CARBINE, name of XVI.-cent. fire-

arm, somewhat shorter than musket, and used chiefly by cavalry; still survives by name of a weapon shorter than rifle.

CARBOHYDRATES, A group of compounds composed of carbon, hydrogen and oxygen in which the ratio of hydrogen to oxygen is the same as in water—namely, two of hydrogen to one of oxygen. It includes a number of very common naturally occurring substances, of which the sugars, the starches and the celluloses are the most important. They enter very largely, therefore, into the diet of men and animals. The more important sugars may be divided into two groups, known as monoses and bioses. Monoses have the formula $C_6H_{12}O_6$, and include grape sugar, or glucose, and fructose. The bioses have the formula $C_{12}H_{22}O_{11}$, the most important member of the group being sucrose, or cane sugar. Lactose, or milk sugar, and maltose, or malt sugar, also belong to the group. The polyoses are highly complex substances having molecules of great size, and include starch, dextrin and cellulose. Their formula is written $(C_6H_{10}O_5)_n$ to indicate that while their molecules consist of carbon, hydrogen and oxygen combined in the proportions indicated, the exact number of atoms in the molecule is not yet known. Starch is found in large quantities in all kinds of grain and in tubers, such as the potato. Dextrin is an intermediate product in the conversion of starch into glucose. Cellulose is the principal constituent of wood fibers, and of linen, cotton, hemp and flax.

CARBOLIC ACID, PHENOL (C_6H_5OH), colorless, crystalline solid of characteristic smell and caustic taste, S.G. 1.09, M.P. 42°, B.P. 183°. Extracted from coal-tar, first as sodium phenate by mixing with soda, the phenol next separated by sulphuric acid and purified by fractional distillation. Used in med. as a disinfectant and antiseptic, as a spray, lotion, ointment, or dressing, also internally, in weak doses, for arresting fermentation in alimentary tract; also used for preparation of salicylic acid and for preparation of picric acid (*Trinitrophenol*), from which the explosive Lyddite is prepared.

CARBON C. Atomic weight 12. An element occurring in nature to some extent in the free state and very abundantly in combination. In the free state it exists as the diamond, as graphite and as charcoal. In combination it forms an essential constituent of the bodies of all animals and of the substance of plants, while in the mineral kingdom it is widely distributed in the form of carbo-

CARBON C.

nates such as chalk, limestone, magnesite, etc. The fact that the diamond consists of pure carbon was first demonstrated by Lavoisier in 1694. Graphite was long believed to be a form of lead, the name being still retained in such common articles as 'lead' pencils, 'blacklead', etc. Kastner demonstrated that it was a form of carbon. In its various modifications carbon finds many uses in industry. Graphite is used for the manufacture of pencils, as a lubricant, for electrodes in electrolytic cells, as a polish and for other purposes. Wood charcoal is used as a filtering medium, in the manufacture of gunpowder, and as a constituent of cattle feed. Animal charcoal is used in immense quantities as a decolorizer in the sugar industry, and to a lesser degree as a pigment. Carbon black and lampblack produced by the incomplete combustion of natural gas and oil, are used as pigments in paints, inks and rubber. Gas Retort Carbon is a very hard form, resembling coke in appearance. It forms as a deposit on the upper surface of retorts used in the preparation of coal gas. It finds a use as electrodes in electrolytic cells or in the manufacture of rods for electric arc lights.

In recent years, activated carbons have aroused much interest in scientific and industrial circles. These carbons have the property of absorbing, to a marked degree, various bodies with which they are brought in contact. During the European war, activated carbons were used by all combatants in the canisters attached to gas masks, as an absorbent for the poisonous gases used by the enemy. Similar carbons are now used in various industries for removing impurities and colored substances from food products and chemicals. The raw sugar from which white granulated sugar is manufactured is a reddish-brown color. It is dissolved in water and the color and impurities are removed by filtration through carbon. Animal charcoal has been largely used for this purpose for more than a century, but as the charcoal contains only ten per cent of carbon, the balance being mineral matter, very large quantities of charcoal are required. The higher grades of activated vegetable carbons, however, contain from 95 to 98 per cent. of carbon, and are very much more active than animal charcoal. Extremely small percentages can therefore be used and it seems possible that they will ultimately entirely replace animal charcoal. The exact methods by which these carbons are manufactured are kept as trade secrets, but one of two methods forms the basis of most of them. In one process, wood or some similar

CARBONATES

carbonaceous material is impregnated with zinc chloride, and is then dry distilled. The zinc chloride sublimes and is recovered, the residual carbon being more or less active according to the temperature and other conditions of distillation. In the other process, carbon derived from wood, lignite or some other source is subjected, at high temperatures, to the action of activating gases. The carbon used in gas masks was prepared, in this country, from coconut shells, by treating the carbonized shells with super-heated steam at a temperature approximating 1000° C.

CARBONDALE, a city of Pennsylvania, in Lackawanna co. It is on the New York Ontario and Western, and the Delaware and Hudson railroads, and on the Lackawanna river. It is the center of an important coal mining region and its industries include machine shops, car shops, foundries, etc. It is the seat of a Roman Catholic Academy. Pop. 1920, 18,640.

CARBON BISULPHIDE (CS_2), chemical product; heavy, colorless, volatile liquid; S.G. 1.292, B.P. 46; poisonous; inflammable; disagreeable smell; prepared by passing sulphur vapor over red-hot charcoal; used as solvent for gums, caoutchouc, sulphur, iodine

CARBON PAPER, thin paper coated on one side with pigment; used for duplicating written or type-written matter.

CARBON PROCESS, one of the most permanent of photographic printing processes; based on fact that gelatine, when impregnated with bichromate of potash, becomes insoluble in hot water after exposure to light. By mixing pigments with the gelatine, prints in any color are obtained.

CARBONARI, THE ('charcoal-burners'), members of secret revolutionary societies in Italy, Spain and Portugal, and France, where they were known as the *charbonniers*, during early XIX. cent. Amongst members of the Ital. branch were Mizzini, Silvio Pellico, and Lord Byron. Their aims were republican in France, nationalist in Italy; every effort was made by the Austrians to stamp them out in Italy, where they greatly contributed to winning of Ital. freedom.

CARBONATES (salt of carbonic acid), widely distributed in nature, commonest being calcium carbonate ($CaCO_3$), e.g. limestone, chalk, marble; all insoluble except those of alkali metals; decomposed by heat into carbon dioxide and the metallic oxide. Bicarbonate is a salt in which only one of the hydro-

CARBONIC ACID

gen atoms of the acid is displaced, (e.g.) NaHCO_3 , an acid c.

CARBONIC ACID, a term applied to the hypothetical substance H_2CO_3 , but more often to the anhydrous form, carbon dioxide CO_2 , or C.A. gas. Carbon dioxide occurs in the atmosphere to the extent of four volumes in 10,000, though in towns the amount may be larger. It occurs also in solution in river and sea-water, being carried down by rain or liberated from decomposing carbonates in the soil. The gas is produced in large quantities in lime kilns, being formed by the decomposition of the chalk or limestone from which the chalk is made. Fermentation and putrefaction give rise to carbon dioxide, which may exert considerable pressure if the processes are carried out in closed vessels. In the laboratory, carbon dioxide is prepared by treating marble or chalk with dilute hydrochloric acid, but it may generally be stated that all carbonates when treated with most acids yield the gas. C.A. is a colorless gas about 1.5 as heavy as air, moderately soluble in water; it liquefies at 0°C . under a pressure of thirty-six atmospheres. It is used in the preparation of aerated waters, quantities being dissolved in water under pressure to produce the sparkling effect when the pressure is at length removed by releasing the stopper of the bottle.

CARBONIC OXIDE, or CARBON MONOXIDE (CO), a gas formed during combustion when the excess of oxygen is not sufficiently large. It is found in chimney gases, in the gases of blast furnaces, and in the vapors arising from volcanoes. It is prepared in the laboratory by the action of concentrated sulphuric acid on oxalic acid, an equal volume of carbon dioxide also being produced. Carbon monoxide is a colorless, odorless gas slightly lighter than air. It is slightly soluble in water and burns with a pale blue flame to form carbon dioxide; this flame may sometimes be observed near the top of a coal fire when there is incomplete combustion in the lower part of the grate, or when the carbon dioxide first formed is turned into carbon monoxide by passing over a heated mass of coal. CO is a very poisonous gas, and is particularly dangerous in coal mines, where it is sometimes formed in small quantities.

CARBONIFEROUS SYSTEM is the term applied to the great division of geological strata which contains the coal measures. It overlies the Devonian, old red sandstone, and is overlaid by the Permian system, and attains sometimes a thickness of 20,000 ft. It is represented

CARBURETOR

in Europe by the coal fields of Britain, Belgium, Westphalia, North and Central France, Bohemia, and S. Russia, and occupies vast tracts of N. America, Australia and New Zealand. It presents two well-marked subdivisions—a lower mainly of marine formation, and an upper of freshwater origin, the order of succession and constitution of the sections in Great Britain being shown as follows, from the surface downwards: 1. Coal Measures—Sandstones, shales, ironstones, fire-clays with interstratified workable coal seams, this is called the Upper C.; 2. Millstone Grit—Grits, flagstones, sandstones, shales with thin coal seams; 3. Carboniferous Limestone—Limestones, shales, sandstones with thin coal seams, these are called Lower C.

Fossils under two types, viz.: 1. Marine, of the Limestone section, include corals, crinoids, mollusca, crustacea, fish, shark order; 2. Freshwater and Terrestrial, of Coal Measures—Plants: Tree ferns, giant equisetums, lycopods, conifers. Animals: Mollusca, scorpions, insects, ganoid fishes, and giant amphibians, Labyrinthodonts.

The character and disposition of the carboniferous strata suggest their formation during periods of subsidence alternating with rest, while the vegetable remains indicate a warm, moist, and equable climate.

CARBONITE, an explosive; 25% nitroglycerine and 75% wood meal, alkali nitrates, and sulphur.

CARBORUNDUM (SiC), silicide of carbon; crystalline solid, colorless when pure, commercially brown to black from impurities, very hard, prepared by heating sand with coke in electric furnace; used for polishing metals, jewels, and glass.

CARBOY, large glass bottle used by drysalters for holding corrosive liquids.

CARBUNCLE, in med., a spreading inflammation of the deeper layers of the skin, followed by suppuration and sloughing, and the c. may burst upon the surface. The patient is often feverish, cannot sleep, and quite ill for some weeks. The treatment is to relieve the pain with opium and exercise the c. swabbing the wound with carbolic acid and packing with gauze.

CARBURETOR. The device used to produce an explosive mixture from a liquid fuel and air is called a carburetor. Such a device is a necessary part of any internal combustion engine, using liquid fuel which is volatile at ordinary temperatures.

The earlier forms of carburetor were known as vaporizers; this name however

CARCAGENTE

does not describe the contrivance adequately, since not only vaporization, but also thorough mixture with a definite quantity of air is necessary for proper use of the fuel. The usual carburetor consists of a compartment called a float chamber, in which the liquid fuel is kept at a constant level by means of a float-controlled valve. A small pipe, terminating in one or more nozzles, or jet tubes, leads from this compartment into an adjacent one called the vaporizing chamber. Here, air which may have been previously heated by contact with the exhaust manifold of the engine, is drawn past the nozzles by the aspirating stroke of the piston. The current so created causes the fuel to flow through the nozzles, thus becoming vaporized and thoroughly mixed with air. Both the quantity of air and the quantity of fuel can be directly controlled and the proper functioning of the carburetor depends on these two adjustments.

CARCAGENTE (39° 8' N., 0° 29' W.), town, on Júcar, Valencia, Spain; linen and silk manufactured. Pop. 12,800.

CARCANET.—(1) a necklace; (2) neck chain by which prisoners were attached until abolition of penalty, 1832.

CÁRCAR (10° 5' N., 123° 35' E.), town, Cebú, Philippine Islands; sugar. Pop. 32,000.

CARCASSONNE (43° 13' N., 2° 20' E.), town, Aude, France; on Aude; splendidly preserved and complete mediaeval rampart; fortress restored by Napoleon III.; Church of St. Lazarus contains tomb of Simon de Montfort; scene of massacre of Albigenses, 1210; bp.'s see; cathedral, XIII. cent.; celebrated for manufacture of woolen cloth; wine. Pop. 30,000.

CARDAN, CARDANUS, HIERONIMO, CARDONO (1501-76), Ital. physician, mathematician, and astrologer; studied med. at Pavia and Padua, and while a physician at Milan and afterwards prof. of Med. at Padua he wrote important works on math's, as well as a well-known work on astrology which brought him European fame. He visited Scotland and England in 1551, writing an account of the court of Edward VI. Banished from Milan, he became a prof. at Bologna, but was deprived of his chair by the Pope on the ground of heresy, and spent the rest of his life in Rome, writing his autobiography, *De Vita Propria*, which is considered one of the most valuable and interesting works of its kind.

CARDBOARD, stiff paper or pasteboard formed by pasting together several layers of paper; Bristol Board is used for pen-and-ink sketches, wash drawings, etc.

CARDINALS

CARDENAS (23° N., 81° 12' W.), town and port, Cuba; chief export, sugar. Pop. 30,000.

CARDIFF, parl. bor. and seapt., on Taff, Glamorgan, Wales (51° 28' N., 3° 10' W.); has castle dating from 11th cent., which was besieged by Cromwell in 1648; town almost destroyed during siege by Owen Glendower in 1404. Among outstanding features are two parish churches, free library, museum, hospital, etc.; several parks, including Cathays Park, in which is Univ. College (one of three colleges of univ. of Wales); magnificent new town hall, munic. buildings, and law courts; offices of Central Board of Education for Wales, borough technical schools, and Baptist theological coll. Great manufacturing and trading center; exports enormous quantities of coal, also iron, tinplate, etc.; industries include shipbuilding, smelting, iron and steel works, brewing, manufacture of chemicals, etc.; imports ores, provisions, live cattle, esparto; has large cold-storage accommodation and magnificent docks. Pop. 182,300.

CARDIGANSHIRE (52° 5' N., 4° 36' W.), maritime country, S. Wales; bounded by Merioneth, Montgomery, Radnor, Brecknock, Carmarthen, Pembroke, and Cardigan Vay; area, 692 sq. miles; surface generally mountainous, except along coast; highest peak, Plinlimmon; chief rivers, Teifi, Aeron, Towy, Rheidol, Ystwith. Soil is chiefly clay, loam, or peat; produces wheat, barley, oats, and other crops; cattle, sheep, and horses raised; minerals include lead, zinc, silver, copper, slate; manufactures gloves, woollens; chief towns, Cardigan, Aberystwith, Lampeter. C. was occupied by Romans; invaded by Danes in X. and XI. cent's; by Normans in 1092; annexed to England by Edward I., 1284. Pop. 1921, 61,292.

CARDINAL, of chief importance. C. numbers are 1, 2, 3, etc., distinguished from the ordinals (i.e.) the 'ranked' numbers, 1st, 2nd, 3rd, etc. The c. points of the compass are N., S., E., and W.; of the heavens, zenith and nadir. The c. signs are Aries, Cancer, Capricornus, and Libra.

CARDINAL BIRD, a name applied to several scarlet birds on account of their plumage; but probably originally to North American bunting (*Cardinalis virginianus*), a common cage-bird.

CARDINAL FISHES (*Apogonidae*), small, brightly-colored, perch-like bony fishes; common in warm seas, venturing even into fresh water.

CARDINALS, R.C. dignitaries, next in rank to the Pope. The Sacred College

CARDINAL VIRTUES

of C's, since the time of Sixtus V., consists of a number of members not exceeding seventy, viz.; six c.-pb's.; fifty c.-priests; and fourteen c.-deacons. All cardinals are chosen by the Pope, and the c's themselves choose the Pope, taking control of the affairs of the Church during any temporary vacancy of the Holy See. A c's hat is conferred personally by the Pope, who also bestows upon the c., at the same time, the sapphire ring of his office. A consistory of c's usually meets fortnightly, under the presidency of the Pope.

CARDINAL VIRTUES, prudence, fortitude, justice, temperance; the theological virtues, faith, hope, and charity, are sometimes added.

CARDING, process in cotton-spinning, performed by card-room operatives, and consisting of combing or 'carding' the fibres in parallel lines preparatory to further treatment. Improvements were introduced by Peel, Arkwright, and others.

CARDS, PLAYING, the origin of card games is obscure, and their invention has been ascribed to the Egyptians, Arabs, Chinese, and Hindus. Cards were manufactured in England, Germany, and Italy in the early part of the XV. cent.; importation was forbidden by Edward IV.; and a tax was first imposed by James I.

CARDUCCI, GIOSUÈ (1836-1907), one of the greatest Ital. poets; prof. of Lit., Bologna; followed classic tradition; His *Hymn to Satan* marks his intellectual leadership of revolt against Romanticism.

CARDWELL, EDWARD (1787-1861), Eng. theologian; b. Blackburn, Lancs; ed. Oxford; Camden prof. of Ancient History, 1825; rector of Stoke Bruern, 1828; pub. *Lectures on the Greek and Roman Coinage*, 1833; *Documentary Annals of the Reformed Church of England*, 1839; *Reformatio Legum Ecclesiasticarum*, 1850, etc.

CAREENING, to turn a ship on its side, usually for cleaning or repairing; hence to clean or repair.

CAREME, Fr. form of *Quadragesima*, Lent.

CAREW, BAMFYLDE MOORE (1693-c. 1770), Eng. vagabond, 'the king of the gypsies.'

CAREW, GEORGE (d. 1613), Eng. diplomatist; ambassador to Poland and to France; wrote *Relation of the State of France*, Henry IV.

CAREW, RICHARD (1555-1620),

CARGADOS ISLANDS

Eng. antiquary and translator; b. St. Antony, Cornwall; trans. first five cantos of Tasso's *Jerusalem Delivered*, 1594; best known for his *Survey of Cornwall*, 1602, interesting, apart from its intrinsic value as a compendium of country life in Elizabethan age.

CAREW, THOMAS (1595-1645), Eng. poet; b. West Wickham, Kent; ed. Oxford; abandoned law for court employment, and was much favored by Charles I.; one of the most brilliant of Cavalier poets, he will live by virtue of a few incomparable lyrics.

CAREY, HENRY (d. 1743), Eng. poet and musician; reputed s. of Marquis of Halifax; chiefly remembered for his songs, of which *Sally in Our Alley* is best known; also wrote innumerable burlesques, farces, and musical pieces; there is no evidence that *God Save the King* was written by him, though he is often said to have been the author.

CAREY, HENRY CHARLES, an American economist; b. Philadelphia, in 1793. After having accumulated a competence from his publishing business, he retired and devoted himself to study. His first two books, *Essay on Wages*, 1836; and *Principles of Political Economy*, 1837-1840; won him an international reputation. He also wrote *The Credit System in France*, *Great Britain and the United States*, 1838; *The Past, The Present, and the Future*, 1848; *Principles of Social Science*, 1858-1859. He d. in Philadelphia in 1879.

CAREY, MATHEW, an American publisher and writer; b. in Ireland in 1760. He was especially well known for his political writings, the most popular of which, *Olive Branch*, 1814, an attempt to promote harmony among political parties during the War of 1812, passed through ten editions. He also wrote *Irish Vindications*, 1819; and *Essays on Political Economy*, 1822. He d. in Philadelphia in September, 1839.

CAREY, ROSA NOUCHETTE, English novelist, was b. in London and d. in 1909. She was a prolific writer of girls' books.

CAREY, WILLIAM (1761-1834), Eng. Orientalist and missionary; b. Paulerspury, Northamptonshire; worked in early life as shoemaker; became Baptist minister at Leicester; one of founders of the Baptist Missionary Society; went as missionary to India; studied Sanskrit, Punjabi, Bengali, and other languages and dialects, into which he trans. the Bible and of which he compiled dictionaries.

CARGADOS ISLANDS, ST. BRANDON ISLANDS (16° 20' to 16° 50' S.,

56° 26' to 59° 41' E.), in Indian Ocean; dependency of Mauritius (*q.v.*).

CARIA (c. 37° 20' N., 28° 30' E.), in ancient geog., district bordering on Aegean, S.W. Asia Minor; much of surface mountainous; watered by Mæander; belonged to Lydia, subsequently to Persia; conquered by Alexander of Macedon, 334 B.C.; later became Rom. province; chief towns were Miletus, Halicarnassus, Cnidus; noted for pirates in Rom. times.

CARIBA, OR CARIBE FISHES (*Serrasalmo*), small deep-bodied fishes found in the warm rivers of tropical and sub-tropical America; they have sharp teeth, and are exceedingly bloodthirsty, attacking in crowds any living thing that ventures near their haunts.

CARIBBEAN SEA (15° N., 73° W.), between Antilles and Central and S. America; connected by Strait of Yucatan with Gulf of Mexico; formed by subsidence of earth's crust, of which depression forming Mediterranean basin is regarded as continuation.

CARIBBEE ISLANDS, LESSER ANTILLES (16° N., 61° 30' W.), chain of islands, eastern side of Caribbean Sea, forming portion of West Indies.

CARIBOU, Ind. name for N. Amer. reindeer, which are essentially similar in characteristics and habits to European reindeer, though not domesticated; their flesh supplies Indians and Eskimos with main store of food.

CARIBS, natives of West Indies and Spanish Main, now chiefly settled in Nicaragua and Honduras; name given by Columbus.

CARICATURE (Ital. *caricatura*), drawing, painting, or description in which individual characteristics are so exaggerated, or distorted, as to appear ridiculous. The word was first employed in English in *Christian Morals*, a posthumous book of Sir Thomas Browne. It is also to be found in its Ital. form in *The Spectator*, 1712. There is evidence in carvings and papyri that the art of c. was employed to a limited extent by the Greeks, Romans, and Egyptians. It was not, however, until the Middle Ages that its use became widespread throughout Europe; it was then usually expressed in the form of gargoyles and grotesque decorations in ecclesiastical architecture. Its most notable earl exponent was Hans Holbein, 1498-1554, in his *Dance of Death*.

CARIES, medical term applied to a process of gradual disintegration of a

bone or tooth; may be caused by an injury or may result from syphilis, tubercle, or 'struma.'

CARIGARA (11° 20' N., 124° 35' E.); town and port, N. coast, Leyte, Philippine Islands; cotton manufactures. Pop. 14,000.

CARIGNAN, PRINCES OF, younger branch of house of Savoy; Charles Albert, prince of C., succ. as king of Sardinia, 1830, and was f. of Victor Emanuel II., king of Italy, 1860.

CARILLON, series of bells tuned to a scale.

CARIMATA, KARIMATA.—(1) (c. 1° 34' S., 109° E.) islands, Malay Archipelago, W. of Borneo; area, 57 sq. miles. (2) chief island of C. group. (3) strait between Borneo and Billiton.

CARINI (38° 8' N., 13° 11' E.), town Palermo, Sicily; near ruins of ancient Hyccara. Pop. 13,000.

CARINTHIA (46° 45' N., 14° E.), Austrian province; area, c. 4,000 sq. miles; surface mountainous; watered by Drave; capital, Klagenfurt; produces lead and iron ores; manufactures iron and steel goods, machinery, rails; rye, oats, and wheat grown; horses, cattle, and sheep raised; has belonged to Austrian royal house since 1835. Pop. 367,000.

CARINUS, MARCUS AURELIUS (c. 283 A.D.), Rom. emperor; was a man of dissolute habits, and his life was stained with many crimes.

CARIFE (10° 15' N., 63° 25' W.), town, Bermudez, Venezuela; has remarkable caverns, which are inhabited by the guacharo bird, the young of which are killed for their oil.

CARISBROOKE (50° 42' N., 1° 20' W.), town, Isle of Wight, formerly capital; mediæval stronghold; ruined castle was prison of Charles I., 1647-48.

CARISSIMI, GIACOMO (1604-74), Ital. composer; writer of numerous oratorios; believed to be originator of Chamber Cantata; *Japhithah* is regarded as his masterpiece.

CARL, WILLIAM CRANE (1865), American organist. Was pupil of Samuel P. Warren and M. Alexandre Guilman. He was the first concert organist to play in the far north and has given many organ concerts in the First Presbyterian Church, New York. The great organ at the St. Louis Exposition was displayed by him. He composed several songs and organ arrangements in 1892 and edited *Thirty Postludes for the Organ*, in 1900; also *Master Studies for the Organ* and

CARLEN

Ecclesiastiae Organum, Voluntaries for the Church Service. Historical organ collections.

CARLÉN, EMILIE (1807-92), Swed. novelist; Eng. trans. of her works are common; her dau., Rosa C., 1836-83, was also a well-known writer.

CARLETON, GUY (1857), was b. at Austin, Texas, graduating at the U.S. Military Academy in 1881. He was appointed to a cavalry regiment the same year, and has served in many parts of the United States, and also in Cuba and in the Philippines, in 1916-17, being inspector-general of the Philippine Department.

CARLETON, WILL (1845-1912), poet, was b. at Hudson, Mich. He traveled widely as a lecturer in the Northern and Western States, in Great Britain and Canada. Many of his ballads of domestic life, *Farm Ballads*, *Farm Festivals*, *Farm Legends*, *Songs of Ten Centuries*, have won him wide popularity. He was also for a time the editor of the illustrated magazine, *Everywhere*.

CARLETON, WILLIAM (1704-1869), Irish novelist; s. of a small farmer in co. Tyrone. He is chiefly remembered by his *Trails and Stories of the Irish Peasantry*, 1830-33, but also wrote many novels of Irish life and character.

CARLETON COLLEGE, a co-educational institution in Northfield, Minn.; organized in 1866, under the auspices of the Congregational Church, to which in recent years have been added those of the Baptist Church. Number of students, in 1922, 826 with a faculty of 61. President, D. J. Cowling, Ph.D.

CARLILE, RICHARD (1790-1843); Eng. freethinker; b. Ashburton; s. of a shoemaker, and by trade a tinsmith; was greatly influenced by reading Thomas Paine's *Rights of Man*, and thereafter devoted himself to the publication and dissemination of free-thinking lit., for which he was condemned to various terms, altogether nine years, of imprisonment.

CARLILE, WILSON, Anglican clergyman who founded mission known as Church Army, 1882.

CARLIN, JAMES JOSEPH, an American educator; b. Peabody, Mass., in 1872. He was graduated from Boston College in 1892 and took post-graduate work at several Jesuit institutions, after having joined the Society of Jesus in 1892. From 1899 to 1904 he was professor of Latin, Greek and English at Georgetown University. In 1907 he was ordained priest. From 1910 to 1912 he was lecturer on scholastic philosophy at

CARLISLE

Holy Cross College, Worcester, Mass., and from 1912 to 1918 assistant to provincial of Maryland, becoming president of Holy Cross College in July, 1918.

CARLING SUNDAY, 5th Sunday in Lent, so called from dish of fried carlings, dried peas, eaten on that day; old line, 'Carling, Palming, Paste Egg Day,' was remembrancer of three consecutive Sundays.

CARLISLE, a borough of Pennsylvania, in Cumberland co., of which it is the county seat. It is on the Philadelphia and Reading and Cumberland Valley railroads, 18 miles west of Harrisburg. It is the center of an important farming community, and is a trade center for Cumberland county. It is the seat of several important educational institutions, including Dickinson College, Metzger Female College, etc. Up to the time of its discontinuation, the United States Indian Training School was here. Carlisle has important manufacturing establishments. It has an excellent library, a hospital, etc. During the Whiskey Rebellion, in 1794, it was the headquarters of General Washington, and in 1863 was bombarded by the Confederates under General Lee. Pop. 1920, 10,916.

CARLISLE (54° 53' N., 2° 56' W.), town, Cumberland, England; seat of bp.; has fine cathedral founded by William Rufus, who also built the castle; grammar school founded by Henry VIII.; iron foundries; manufactures textiles, tinplate, shoes; belonged to Romans, many traces of whose occupation remain; sacked by Danes, 875; added to England by William Rufus; many times besieged by Scots; besieged by Bruce, 1315; by Leslie, 1644-45. Pop. 1921, 53,200.

CARLISLE, JOHN GRIFFIN, an American lawyer and statesman; b. in Campbell county, Ky., in 1835. He was educated in the public schools, studied law and was admitted to the bar in 1858. During the Civil War he actively opposed secession. After having served several terms in both the upper and lower houses of the Kentucky legislature, he was elected lieutenant-governor in 1871 and to Congress in 1876. As a result of his ability he soon became one of the leaders of the Democratic party and he was re-elected five times, serving as speaker of the House in the 48th, 49th, and 50th Congresses. He was elected Senator from Kentucky in 1890, resigning in March, 1893, to become Secretary of the Treasury in President Cleveland's Cabinet. After the completion of his term he practiced law in New York City, where he d. in July, 1910.

CARLISTS, adherents of Don Carlos of Spain (1788-1855), bro. of Ferdinand VII., whose infant *dau.*, Isabella, despite the Salic law, was proclaimed queen after his death; civil war ended with defeat of the C., 1840; the grandson of Don Carlos, Carlos VII., revived claim, but an attempt to enforce it was defeated, 1876.

CARLOMAN, name of three Frankish rulers.—(1) s. of Charles Martel, bro. of Pippin the Short, d. 754; (2) king of Franks, s. of Pippin the Short, bro. of Charlemagne, 751-71; (3) king of France, d. 884, s. of Louis II., the Stammerer.

CARLOS I. (1863-1908), king of Portugal, 3rd ruler of the Braganza-Coburg line, succ. 1889; determined to assert the power of the crown and put an end to the tyranny of party leaders like Castro and Ribeiro; he therefore suspended the constitution, 1907, and app. Senor Franco dictator; for this step he was assassinated in Lisbon, together with his elder s., Louis, Feb. 1, 1908. He was succ. by his younger s., Manuel II., b. 1889, who was dethroned by the republican party, 1910, and sought refuge in England.

CARLOS, DON (1545-68), Prince of Asturias; s. of King Philip II. of Spain and his first wife, Maria, *dau.* of John III. of Portugal. He grew up indolent and vicious, and developed signs of insanity. He was placed in confinement by his f., and died mysteriously during his period of incarceration. He was betrothed, 1559, to Elizabeth, *dau.* of Henry II. of France, but she shortly afterwards became his f.'s third wife.

CARLOS, DON (1788-1855), 1st Carlist claimant to Span. throne; s. of King Charles IV.; held prisoner in France by Napoleon, 1808-14; d. at Trieste.

CARLOS, DON (1848-1909), claimed Span. throne as Don Carlos VII.; s. of Don John of Bourbon, grandson of above; lived a wandering life in various countries; lack of decision was fatal to his pretensions, and the throne continued to be held by Alphonso XII. and XIII.

CARLOW (52° 45' N., 6° 50' W.), inland county, Ireland; area, 346 sq. miles; soil fertile; stock raising carried on; surface flat or slightly undulating; produces limestone, marble; drained by Barrow with tributary Burren, and Slaney with tributary Derreen; capital, Carlow. Pop. 36,000.

CARLSBAD, KAISER-KARLSBAD (50° 13' N., 12° 53' E.), town, Bohemia;

fashionable watering-place, noted for mineral springs of which most remarkable is Sprudel; this has numerous orifices, and temperature of 164° F.; mineral waters and C. salts are largely exported; named after Charles IV. 1347-78. Conference of Ger. ministers and officials held here, 1819, at which resolutions (*Carlsbad decrees*) for the suppression of Liberal agitation were passed. Pop. 15,000.

CARLSRUHE. See KARLSRUHE.

CARLSTADT, ANDREAS RUDOLF BODENSTEIN (1480-1541), Ger. reformer; was preacher and prof. of Theol. at Wittenberg, and became one of the leading Reformers. His extreme views and drastic methods, however, brought him into conflict with Luther and the Elector Frederick, and he was compelled to leave Saxony; eventually became prof. of Theol. at Basel, 1534.

CARLTON (53° 10' N., 0° 50' W.); town, Nottinghamshire, England. Pop. 16,000.

CARLTON, NEWCOMB (1869-1923), engineer and former president of the Western Union Telegraph Company, was b. at Elizabeth, N. J., and educated at the Stevens Institute of Technology. He practiced as a mechanical engineer at Buffalo and later became vice-president of the Bell Telephone Company, and then of the Westinghouse Electric and Manufacturing Company. Later he went to London as the managing director of the British Westinghouse Electric and Manufacturing Company, this post being followed by the presidency of the Western Union Telegraph Company.

CARLTON, WILLIAM NEWNHAM CHATTIN (1873), American librarian, attended Holyoke, Mass. High School and Mt. Herman School, Mass. Hon. M.A., Trinity College, Conn., 1902; L.H.D., Trinity, 1915. Was Librarian of Trinity College, 1899-1909 and Instructor in English there from 1901-3. Librarian of Williams College in 1922. Charles Jeremy Headley, LL.D., *A Memoir*, was published by him in 1902 as were also, *Bibliography of the Official Publications of Trinity College, 1824-1906*, 1905; *Poems and Letters of Lord Byron*, 1911; *Notes on Bridgewater House Library*, 1913; *Contributes to Encyclopedia Americana*, *Modern Language Notes* and *The New York Evening Post Literary Review*.

CARLYLE, ALEXANDER (1722-1805), Scot. preacher; minister at Inveresk (Midlothian) from 1748; moderator of General Assembly 1770. He witnessed the battle of Prestonpans 1745, and his *Autobiography*, pub. 1860, is

valuable as a commentary on the Scot. life of his period; friend of many notable men; called 'Jupiter Carlyle' owing to impressive appearance.

CARLYLE, THOMAS (1795-1881), Scot. historian, essayist, and philosopher; b. Ecclefechan, Dumfriesshire; second s. in a family of ten children of James Carlyle, stonemason, and later small farmer. He was ed. at the parish school, Annan Academy, and, in 1809, became a student of Edinburgh Univ. Here he acquired little beyond a slender knowledge of the classics and a moderate success in math's. He had intended entering the ministry, but this idea was abandoned, and he was app. mathematical master at Annan Academy, exchanging later to a school at Kirkcaldy, where he met and formed a lasting friendship with Edward Irving, master of a rival school.

By 1818 C. was back in Edinburgh where he studied law and took private pupils. Law, in its turn, was abandoned, but the teaching was continued for some years. Next he embarked upon a literary career, was engaged by Dr. Brewster to write articles for the *Edinburgh Encyclopedia*, and received \$50 for a trans. of Legendre's *Geometry*. At this period he also wrote his *Life of Schiller*, translated Goethe's *Wilhelm Meister*, visited London and Paris, making the acquaintance of Coleridge, Hazlitt, and others, and received the first of a series of encouraging letters from Goethe. In 1826 he m. Jane Baillie Welsh, and they set up housekeeping at Comely Bank, Edinburgh. Here C. wrote *Specimens of German Romance*, 4 vol's, and became a contributor to the *Edinburgh Review*. Two years later C. moved to his wife's property at Craigenputtock, where he wrote *Sartor Resartus*, and maintained the household for six years by his contributions to the reviews.

In 1834 the Carlyles settled at Cheyne Row, Chelsea, which remained their home for the rest of their lives. His masterly *French Revolution* was pub. in 1837; *Sartor Resartus*, 1838; *Chartism*, 1839; *Heroes and Hero-Worship*, 1841; *Past and Present*, 1843; *Oliver Cromwell*, 1845; *Latter-Day Pamphlets*, 1850; *Fredrick the Great*, 1858-65. In 1865 C. was elected Lord Rector of Edinburgh Univ., delivering a Rectorial Address the following year, but the gratification which this brought him was shattered immediately after by the sudden death of his wife. Thenceforth his output of work was small, and he lived more or less in retirement. C. exercised a more powerful influence upon the lit. and the religious, ethical, and political views of his time than any contemporary English writer.

His work is remarkable for its qualities of humor, sarcasm, and profound insight, and his vivid and picturesque style is distinctly characteristic of the man. In his disposition C. was often irritable, hasty, and inconsiderate, afflicted as he was by chronic dyspepsia, yet these defects scarcely served to hide a noble and tender nature; and it embittered his later years to learn, after his wife's death, how much she had suffered from his lack of sympathy and appreciation.

CARMAGNOLA (44° 51' N., 7° 42' E.), town, Turin, Italy; with cathedral; silk. Pop. 12,000.

CARMAGNOLE—(1) form of vest worn by the revolutionaries who, in 1792, came to Paris from South of France to assist in the Revolution. (2) song and dance indulged in by the Republicans at popular gatherings.

CARMAN, (WILLIAM) BLISS (1861), poet, b. at Fredericton, N.B., and educated at the University of New Brunswick, at Edinburgh University and at Harvard. For two years he studied law, later joining the staff of The Independent, New York, and in 1894 becoming editor of The Chap Book of Boston.

CARMARTHEN (51° 52' N., 4° 19' W.), county town and port, on Towy, Carmarthenshire, Wales; ancient *Mari-dunum*; old castle now forms county jail; grammar school; Presbyterian coll.; iron foundries; salmon fisheries. Pop. 11,000.

CARMARTHENSHIRE (51° 55' N., 4° 10' W.), maritime county, S. Wales; bounded N. by Cardigan, E. by Brecknock, S.E. by Glamorgan, S. by Carmarthen Bay, W. by Pembroke; area, 918 sq. miles. Surface generally is mountainous, marshy round coast; highest peak, Carmarthen Van; chief rivers, Towy, Telf, Amman; produces oats, wheat, barley; dairying carried on; horses, sheep, and cattle raised; minerals include coal, lead, copper, iron, slate; manufactures leather, woollens; county town, Carmarthen; has Trulldical and Roman remains; suffered from Dan. invasions; opposed Normans; conquered by Edward I. Pop. 1921, 175,069.

CARMATHIANS, militant Mohammedan sect of X. cent.

CARMAUX (44° 3' N., 2° 7' E.), town, Tarn France; extensive coal-fields. Pop. 11,000.

CARMEL, MT. (32° 45' N., 35° 2' E.), mountain ridge, Palestine, stretching 14 miles S.E. to N.W. and terminating abruptly in rocky headland, Mediterranean coast; highest point, 1,742 ft.;

CARMELITES

richly wooded slopes; numerous caves; scene of deeds of prophets Elijah and Elisha.

CARMELITES ('White Friars'), mendicant order, founded on Mount Carmel, whence the convents are called 'Carmels', in XII. cent.; dress, brown habit with white cloak and scapular; C. nuns instituted during XV. cent.; there were about forty friaries of the order in England at time of dissolution of monasteries.

CARMEN SYLVA, pen-name of Elizabeth, Queen of Rumania, 1843-1916. In 1869 she married Prince Charles of Rumania, who in 1888 became King. After the death of her only child, a daughter, in 1874 she devoted much of her time to writing and soon won an international reputation especially as a poet. Her best known works were *Storms*, 1881; *Pilgrim Sorrow*, 1884; *Thoughts of a Queen*, 1882. She also did much to collect Rumanian folk-lore poems and stories and to make them better known by means of translations. She was greatly beloved in her adopted country as a result of her graciousness and benevolence and did much to improve living and working conditions for Rumanian women. She died at Bucharest in March, 1916.

CARMONA (37° 29' N., 5° 41' W.), ancient town, Andalusia, Spain; many Moorish and Rom. antiquities. Pop. 18,000.

CARMONTELLE, name given to Louis Carrogis (1717-1806), Fr. portrait painter, engraver, dramatist, and author of two books of witty *Proverbs*.

CARNAC (47° 36' N., 3° 4' W.), village, Morbihan, France; remarkable on account of number of monolithic alignments in its neighborhood, one group from Ménec extending towards Kermario, reappearing at Kermario and possibly previously stretching as far as the alignment at Kerlescant. The monoliths, of granite, are arranged in avenues and vary in height from 18 to 3 ft. The Scottish archaeologist, James Miln, undertook excavations in this district, 1874-80, and discovered evidences of Roman and pre-Roman settlements.

CARNARVON (53° 9' N., 4° 16' W.), seaport, watering-place, capital of Carnarvonshire, N. Wales; castle founded by Edward I. 1284; birthplace of Edward II.; Princes of Wales were formerly invested here, the ceremony being revived in 1911 when the investiture of Edward, Prince of Wales, took place; exports slate and copper ore. Pop. 10,000.

CARNEGIE

CARNARVON, GEORGE EDWARD STANHOPE, EARL OF (1866-1923), an Eng. nobleman and archaeologist, who during 1922-23 was patron of the excavations carried on in Egypt under the direction of Howard Carter, which resulted, in December, 1922, in a discovery of the supposed tomb of Tut-Ankh-Amen. This was one of the most notable archaeological discoveries ever made. See *ARCHAEOLOGY, EGYPT, TUT-ANKH-AMEN*.

CARNARVONSHIRE (53° 2' N., 4° 10' W.), maritime county, N. Wales; bounded by Irish Sea, Denbigh, Merioneth, Cardigan Bay, Carnarvon Bay, Menai Strait; area, 572 sq. miles; surface mountainous; in center is Snowdon, 3,560 ft.; watered by Conway and smaller streams; produces oats, barley; cattle and sheep raised; minerals, slate, lead, zinc; belonged to Romans; resisted Saxons, Normans, English. Pop. 1921, 131,034.

CARNATIC, KARNATAK (8° 10' to 16° N., 77° 20' to 80° 17' E.), old subdivision of India, on Coromandel coast; now part of Madras presidency; was scene of great struggle for supremacy in India between France and Britain in XVIII. cent.; it formed dominions of Newabs of Arcot, and was conquered by Britain in 1783, being formally annexed to Brit. empire in 1801; climate extremely hot; crossed by Western Ghats; watered by Penner, Kaveri, and other streams; chief towns, Madras, Pondicherry.

CARNATION (*Dianthus caryophyllus*), herbaceous perennial; flower bright-colored, originally flesh-colored, fragrant; requires rich, light, well-prepared soil; sown in April in pans in cold frame, but propagated preferably by cuttings or 'layering'; planted out in Sept.; *Malmaison* variety has handsomest flowers; Tree or Perpetual-blooming c's are greenhouse favorites; pest—blight and rust, c. maggot, wireworm.

CARNAVALET, L'HOTEL, museum; Paris; so called by corruption of name of Mme. de Kernevenoy, who purchased it, 1578; acquired by the state, 1866.

CARNEADES (214-129 B.C.), Gk. sceptic philosopher; pupil of Diogenes; the gist of his system of reasoning is that all matter is the result of natural forces; there is no finality in truth, since all experience is relative, and we do not see things as they are, but rather according to the impressions which they make upon us.

CARNEGIE, a borough of Pennsylvania, in Allegheny co. It is on the Wabash, Pittsburgh Terminal, the Pitts-

CARNEGIE

burgh Cincinnati, Chicago and St. Louis, and other railroads. Its chief industry is the manufacture of steel and it has some of the most important steel manufacturing plants in the country. It is also an important coal mining center. Its other industries include the manufacture of lead, stoves, and granite-ware. The public buildings include a library, Elks Home, orphan asylum and other public buildings. Pop. 1920, 11,516.

CARNEGIE, ANDREW (1837-1919), Scot.-Amer. millionaire and philanthropist; b. Dunfermline, Scotland, whence his father emigrated to Allegheny, Pennsylvania. Through his business ability in the iron and steel industries, oil, railways, etc., he rose from poverty to great wealth and power. He applied his wealth to useful purposes, including gifts of public libraries throughout America and Great Britain; church organs to numerous Scot. churches; swimming baths; \$10,000,000, 1901 to pay fees of Scot. students and endow research at the Scot. universities (*Carnegie Trust*); \$15,000,000, 1905, to provide pensions for univ. and coll. professors in the U.S., Canada, and Newfoundland (*The Carnegie Foundation*); \$10,000,000, 1901 to found the *Carnegie Institute*, Pittsburgh, Pa., and the same sum, 1902, for foundation of *Carnegie Institution*, Washington; 'Hero Funds' in U.S., Britain, and France, for the pecuniary assistance of persons injured or, when killed, for the assistance of their dependents in saving life; a palace at the Hague for the Court of Arbitration; \$10,000,000, 1910, to hasten abolition of international war (*Carnegie Peace Fund*), in addition to numerous minor benefactions in America and in his native town of Dunfermline. Author of several works, including *Triumphant Democracy*, *Problems of To-day*, etc.

CARNEGIE ENDOWMENT FOR INTERNATIONAL PEACE, an institution founded in 1910 by Andrew Carnegie with an endowment of \$10,000,000. According to Mr. Carnegie's deed of gift the funds of the endowment are to be administered by the trustees 'to hasten the abolition of war, the foulest blot upon our civilization.' The outbreak of the World War delayed the carrying out of the work of the Endowment. During the World War the Endowment appropriated funds for reconstruction purposes.

The work of the Endowment is carried on through 3 divisions: Inter-course and Education, Economics and History, International Law. It fosters research and gives publicity to the results by means of publishing books and pam-

CARNEGIE HERO FUND

phlets. Its work is directed by a board of trustees which includes many of the most distinguished men of the country. Elihu Root is president of the board of trustees as well as of the executive committee; James Brown Scott, Secretary.

CARNEGIE FOUNDATION FOR THE ADVANCEMENT OF TEACHING, institution founded and endowed by Andrew Carnegie in 1905. Its original function of providing pensions to teachers in higher institutions of learning on retirement from active service has been considerably widened. The original pension plan, under which the Foundation bore the entire financial burden, has been changed so that it now involves certain contributions by the teachers themselves, enabling them to purchase insurance and annuities at a very low cost. The Foundation also makes extensive researches into all phases of education and publishes the results of such researches. The total endowment in 1922 was over \$26,000,000 of which over \$15,000,000 was permanent endowment. In the same year the income was over \$1,500,000. Since its inception the Foundation has distributed about \$10,000,000 in retiring allowances and pensions to over 1,000 persons, of which there are now operative over 600. The Teachers' Insurance and Annuity Association of America, established by the Foundation, has written over 2,000 insurance policies and annuity contracts, representing a total of almost \$10,000,000 in 1923. The foundation maintains headquarters at 522 Fifth Avenue, New York City. The president is H.S. Pritchett. The board of trustees consists of 25 members.

CARNEGIE HERO FUND, a fund created and endowed in 1904 by Andrew Carnegie. It provides rewards for individuals who have performed deeds of unusual heroism or self-sacrifice, or, in case of their death, for their widows and dependents. The rewards consist of medals and money grants. The medals are of gold, silver, and bronze and set forth the circumstances under which the heroic act was performed. Rewards are made only after most careful investigation of all circumstances. The affairs of the Fund are administered by a commission with headquarters at Pittsburgh, consisting of 21 members, this commission being self-perpetuating. The president of the commission since its inception and until his death in 1922 was Charles L. Taylor. Since then the vice-president, W. J. Holland, has acted as head of the commission. The endowment amounts to \$5,000,000. About \$2,500,000 has been awarded since the Fund was

CARNEGIE INSTITUTE

created, together with over 1,600 medals. The Fund covers the United States, Canada, and New Foundland, but similar Funds were established by Mr. Carnegie in Great Britain, and Ireland, France, Germany, Belgium, Netherlands, Sweden, Switzerland, Italy, Norway, and Denmark.

CARNEGIE INSTITUTE OF TECHNOLOGY, a co-educational institution, founded in 1900 at Pittsburgh, Pa., by Andrew Carnegie. The original endowment of \$4,000,000 was later increased by additional gifts to \$9,000,000. The buildings alone are valued at \$5,000,000. The Institute fosters especially technical education. It consists of a College of Engineering, for men only, a department of Fine and Applied Arts co-educational, a department of Industries, for men only, The Margaret Morrison Carnegie College for Women, and a post-graduate Division of Co-operative Research. Besides regular day courses, both night and summer sessions are held. Closely allied with the Institute of Technology is the Carnegie Institute consisting of one of the best and most active Art Galleries in the United States, a Museum, a Library and a Department of Music. In 1923 there were 3,771 students and 285 teachers. Thomas Stockham Baker was elected president in 1923.

CARNEGIE INSTITUTION OF WASHINGTON, an American institution devoted to research. It was founded in Washington, D.C. by Andrew Carnegie in 1902 and incorporated by an act of Congress in 1904. The original endowment of \$10,000,000 was increased by later gifts to \$22,000,000. The articles of incorporation declare its chief objects to be 'to encourage in the broadest and most liberal manner investigation, research and discovery, and the application of knowledge to the improvement of mankind.' These objects are achieved by means of three principal agencies: (1) establishment of departments of research; (2) supplying of means and equipment for research to individuals; (3) a division devoted to editing and printing, providing adequate publication to the results coming from the first two agencies. There are now seven departments and two laboratories, as well as one observatory. The Institution, up to 1922, has issued 442 volumes. Its appropriations for 1922 were almost \$1,500,000. It is controlled by 24 trustees who hold their annual meeting in December. During the interval between annual meetings the affairs of the Institution are conducted by an executive commission, chosen by and from the board of trustees and acting

CARNIVORA

through the president. John C. Merriam, president; Elihu Root, president, board of trustees.

CARNELIAN, a translucent red variety of chalcedony; chiefly found in India.

CARNESECCHI, PIETRO (1508-67), Ital. scholar; enjoyed the patronage of Clement VII. and other influential members of the Medici family, but later, becoming a convert to some of Luther's doctrines, he fell a victim to the Inquisition, and was beheaded.

CARNIC ALPS (46° 42' N., 12° 30' E.), S.E. continuation of Alps, between Venetia, Italy, and Tyrol and Carinthia, Austria.

CARNIOLA (46° N., 14° 30' E.), hilly province of S.W. Austria, among Alps and along Upper Save; area, 3,856 sq. miles; has valuable forests. C.'s wealth lies in minerals; quicksilver mines important; iron, lead, zinc, lignite found; ironworks, linen manufactures; sends twelve representatives to Reichsrath. By the Treaty of St. Germain, (1919), Italy received 782 sq. miles of Carniola, with a pop. of 88,605.

CARNIVAL (Lat. *carni vale*, farewell to flesh), festival held in R.C. countries during several days preceding Lent. In S. of France and Italy, processions, masques, and 'battle of flowers' take place; a notable c. is held at Rome; there is a striking change to religious solemnity on Ash Wednesday, first day of Lent; relic of c. in Eng. Shrove Tuesday.

CARNIVORA, the **CARNIVORES**, or **FLESH-EATERS** (Lat. *caro*, *carnis*, flesh; *vorus*, devouring), perhaps the most interesting of the orders of mammals (*q.v.* for general relationship), containing, as it does, lions, tigers, and leopards, wolves and dogs, bears, badgers, otters, seals, and many other creatures attractive on account of their elegance, beauty, and swiftness, and even of their very ferocity.

To their habit of feeding upon flesh—a habit all but universal in the order—can be traced their most characteristic features. Teeth are well developed; especially large and strong are the curved, pointed eye-teeth, or *canines*, adapted for fixing on and retaining hold of living prey, and the sharp, cutting 'carnassial' back teeth. The toes, which are four or five in number, are tipped with sharp, curved claws, sometimes retractile and obviously fitted for fixing and tearing. To prevent danger of slipping, the lower jaw of carnivores can move only directly up and down, without any sideways motion, owing to

CARNIVORA

the elongated hinge which connects it with the skull; and evidence of the powerful jaw motion is given by the whole bony (*zygomatic*) arch which bridges the skull from cheek almost to ear, and gives room for the passage of the large muscle which works the lower jaw. Shoulder-bones are absent or incomplete; and the upper surface of the brain is well convoluted, an indication of mental power.

The habits of carnivores are familiar. They are mainly terrestrial, living in forest trees, in the thick scrub and underwood, or burrowing in the earth, but some are amphibious, as the otters; and seals and walruses are predominantly aquatic.

Carnivores are generally nocturnal animals, and lie in wait for their prey or follow it by stealth. The greater number hunt singly or in couples, but some, such as dogs and wolves, congregate in packs to pursue and run down their quarry. Mammals, from the largest to the smallest supply them with food; many catch birds, and oddities of diet are presented by the fish-eating otters and seals, the latter feeding also upon crustaceans and molluscs, and, in the case of Antarctic species, on penguins. Not all carnivores are confirmed flesh-eaters, however, for in summer many of the bears limit their diet to fruits and honey.

Carnivores have colonized the whole world from the snows of the Arctic circle to the border of the Antarctic continent; only in Australia and New Zealand are they absent. They are most numerous and often of larger size in the jungles of the tropics, but the largest living carnivore is the almost extinct long-snouted elephant seal, or 'sea-elephant' (*macrorhinus*), of the South Pacific, which may reach a length of about 20 feet.

Carnivores are of considerable value to man, for, apart from their indirect uses in destroying vermin, they furnish the greater part of the world's fur supply. A few have been tamed and kept as pets or as man's assistants, especially dogs, but their fierce nature usually offers an insurmountable barrier to complete domestication.

The Order Carnivora is divided into two sub-orders:—

Sub-Order I., *Fissipedia*.—Carnivora with digits separate and distinct, with free limbs; adapted to terrestrial life; including the cat, civet, aardwolf, hyena, dog, bear, raccoon, and weasel families.

Sub-Order II., *Pinnipedia*.—Carnivora with digits united by a web of skin into a fin-like paddle, hind limbs directed backwards and placed close to body; adapted to aquatic life; including seals and walruses.

CAROLINE ISLANDS

CARNOT, LAZARE HIPPOLYTE (1801-88), Fr. statesman; s. of L. N. M. Carnot; elected deputy for Paris, 1839, and became principal leader of the party against Louis Philippe; declared in favor of the Republic, and, under Lamartine, became Minister of Education; was made life senator by the National Assembly, 1875.

CARNOT, LAZARE NICOLAS MARQUERITE (1753-1823), Fr. general; of republican views, he voted for the death of Louis XVI.; member of Committee of Public Safety; app. Minister of War, 1800; Minister of the Interior during the Hundred Days; spent his later years in scientific study.

CARNOT, MARIE FRANÇOIS SADI (1837-94), Pres. of Fr. Republic; s. of L. H. Carnot (q.v.); ed. as civil engineer, but later entered National Assembly; held positions of Minister of Public Works, 1880; Minister of Finance, 1885; elected Pres. 1887. His term of office, which included the opening of the Paris Exhibition, 1889, proved very popular. He was assassinated by an Ital. anarchist, at Lyons.

CARNUNTUM, ancient Pannonian town, near Vienna; ruins remain; Rom. military center during wars against Germans, and important trading station; demolished by Magyars, IX. cent.

CARNUTES, Celtic people who lived in Central Gaul, between the Loire and the Seine, whose capital was Orleans (*Genabum*).

CARO, ANNIBALE (1507-66), Ital. poet; employed by the Gaddi and Farnese families; trans. the *Aenid*, 1581; also wrote a comedy, canzoni, sonnets, and some light verse.

CAROL, a religious song, originally accompanied by dancing. For this reason most of the old c's were set to dance tunes. Such songs came into vogue when it was usual at Christmas-tide to give a representation, with lay figures, in churches and private houses, of the stable-birth of the child Jesus, which the religious accompanied with singing and dancing. The earliest collection of c's was printed by Wynkyn de Worde, 1521, and contained the famous Boar's Head Carol, *Caput apri defero*.

CAROLINA, CAROLINAS, old Brit. colony in N. America, now forming States of North and South Carolina.

CAROLINE ISLANDS (0° to 10° N., 136° to 164° E.), archipelago, Pacific Ocean, consisting of about 680 small islands, of which Babelthouap, Yap, Rouk, and Ponape are most important; these are volcanic, most of others coral;

CAROLINE POETS

climate temperate; produce copra, sugarcane, cocoanuts, breadfruit; belonged to Spain till 1899, when ceded to Germany; area, 400 sq. miles. Pop. 39,000.

CAROLINE POETS, Eng. poets of time of Charles I. and Charles II. Term usually applied to lyrics, Carew, Crashaw, Herrick, Marvell, Lovelace, Suckling.

CAROLINE, AMELIA AUGUSTA (1768-1821), queen of George IV., m. George, then Prince of Wales, 1795; Princess Charlotte b. following year. After his accession, George attempted to procure a divorce on the ground of adultery, but failed; he directed that her name should be omitted from the liturgy, and she was excluded from the coronation ceremony. She d. nineteen days later.

CAROLINE, WILHELMINA, OF ANSPACH (1683-1737), George II.'s queen; supported Walpole against the 'Patriots' and 'Boys.'

CAROLINGIANS, CARLOVINGIANS, family, descended from Charlemagne, which ruled France, 751-987 A.D., when it was overthrown by Hugh Capet.

CAROLUS-DURAN, pseudonym of Charles Auguste Emile Dubrand (1837-1917), leader of modern school of Fr. portraiture; among his sitters were Emile de Girardin, Duchess of Marlborough, Gounod, etc.; painted a *St. Francis of Assisi*, *L'Assassine*, *La Priere du Soir*, and the ceiling *Glory of Marie de Medici* at the Luxembourg Palace; his *Dame au gant* is in the Luxembourg.

CARPATHIAN MOUNTAINS, great mt. range of S.E. Europe, in Czechoslovakia, Hungary, and Rumania, (44° 43'-48° 10' N., 17° 4'-22° 24' E.); length c. 880 m.; form watershed between Black Sea and Baltic; chief ranges are Transylvanian Alps, Central and Little Carpathians, White Mts., Beskids; highest peak, Franz Joseph Spitze, in Hohe Tetra, 8,787 ft.; covered with timber—oak, beech, fir—up to 4,000 ft.; rich in minerals—coal, silver, copper, lead, iron, salt, petroleum; geological formation chiefly granite, crystallines, and sandstone; numerous small tarns in Central Carpathians; crossed by many passes, including Jablunka and Rother Thurm passes.

Campaigns in the Carpathians.—In the early months of the World War the Russians swept westward towards Cracow and also pushed S. to the Carpathian passes leading into Hungary. By the beginning of Oct., 1914, they had crossed the three eastern passes—Dalatyn,

CARPENTER

Vereczke, and Uzsok—when a German counterstroke towards Warsaw induced a general retirement behind the line of the Vistula and the San, thus raising the siege of Przemyśl. In Nov. most of the lost ground was recovered, and by the middle of the month the Lupkow and Dukla passes in addition were in Russian hands, when an Austrian counter-blow compelled another, although partial, retirement. By the close of the year the Russians held the approaches to all the western passes, and in the E. had overrun the Bukovina, except the corner round the Borgo Pass.

In Feb., 1915, a combined forward movement by the enemy forced the Russians out of the Bukovina and to the upper San, but their center on the Kozłowa ridge, W. of the Beskid Pass, in a bloody engagement extending over several days early in March, withstood all assaults. On March 22 the Austrian garrison which had been shut up in Przemyśl for nearly seven months capitulated, and the Russians again began to press across the Carpathian watershed. Towards the end of April the Austrians developed a counter-attack all along the front, while the Germans were preparing their great blow on the Dunajetz, which in May compelled Russian armies to extricate themselves with all haste from the Carpathian foothills. The menace to Hungary from the central Carpathians was at an end. It was a year later before even the Bukovina could be regained.

CARPEAUX, JEAN BAPTISTE (1827-75), Fr. sculptor; b. Valenciennes; studied at Rome; executed group, *Dancing*, for Paris Opera House; statue of Watteau; numerous busts; and fountain in Avenue de l'Observatoire, Paris.

CARPENTARIA (15° S., 140° E.), large gulf, N. Australia, between Capes Arnhem and York.

CARPENTER BEES (*Kylocopa*), solitary bees which burrow and build rows of cells in solid wood, an egg being deposited in each.

CARPENTER, ARTHUR HOWE (1877), American scientist. Studied at Ohio University Hon. A.M., 1914, and Northwestern University. Was assayer and research chemist of the Deadwood and Delaware Smelting and Refining Co., Deadwood, S. D., 1894-6, and Asst. Supt. of that company, 1898-9. Also held the position of General Manager of the Takima Ore, Mining and Smelting Co. in 1905, and was research metallurgist of the American Vanadium Co., 1912-18. Professor of metallurgy, Armour Inst. Tech., Chicago, 1920.

CARPENTER, EDMUND JAMES

CARPENTER

(1845), American editor and orator. Graduated from Brown University in 1866, Litt.D., 1905. Became a journalist in 1878 and was on staffs of newspapers in Providence, R. I., New Haven, Conn., and Boston, Mass. Editorial writer and literary editor of the Boston Daily Advertiser from 1884-96. Author of *A Woman of Shavmut*, 1892; *The American Advance*, 1903; *Roger Williams*, 1909, and *The Mayflower Pilgrims*, 1917. Also assisted the author on *Letters and Memoirs of Chancellor Kent* and was contributing literary reviewer of the Boston Transcript and Zion's Herald, Boston.

CARPENTER, EDWARD (1844), Eng. author; ed. Cambridge; took Orders, but relinquished them, 1874; devoted himself to Socialist movement; wrote *Towards Democracy*, *Days with Wall Whitman*.

CARPENTER, EDWARD CHILDS (1872), American writer. Was financial editor of the Philadelphia Inquirer from 1905-16. Author of *Captain Courtesy*, 1906; *The Code of Victor Jallot*, 1907; and *The Easy Mark*, 1912. Was also author of several plays among which are: *The Dragon Fly*, produced in Philadelphia in 1905; *Captain Courtesy*, Los Angeles, 1906; *The Barber of New Orleans*, New York, 1909; *The Tongues of Men*, New York, 1913; *The Cinderella Man*, New York, 1916; *The Pipes of Pan*, 1917; *Bab*, dramatization of Mary Roberts Rinehart's novel, New York, 1920; and *Pot-luck*, New York, 1921.

CARPENTER, FRANCIS BICKNELL (1830-1900), American painter; b. Homer, N. Y. He studied art at Syracuse in 1844 and eight years later was made an associate member of the National Academy. He devoted especial attention to portraiture, of which the best known examples are the portraits in the capitol at Albany, N. Y., and of President Fillmore in the New York City Hall. His most noted canvas is the *Emancipation Proclamation*, 1864. His close association with the martyred President during that period led later to the publication of his books, *Six Months in the White House With Abraham Lincoln*.

CARPENTER, FRANK GEORGE (1855), American writer. Graduated from University of Wooster, in 1877, A.M., 1880; Litt. D., 1911. Began newspaper work in 1879 and from 1881 to 1916 traveled all over the world as correspondent for various newspapers and syndicates. Author of Carpenter's Geographical Readers—*Asia*, 1897; *North America*, 1898; *South America*, 1899; *Europe*, 1902; *Through Asia with*

the Children, 1898; Carpenter's Readers of Commerce and Industry; *How the World is Fed*, 1907; *How the World is Clothed*, 1909; *How the World is Housed*, 1911; *Around the World with the Children*, 1917. He also wrote many articles in leading American journals and magazines.

CARPENTER, FORD ASHMAN (1863), American scientist. Educated at Dilworth Academy and Carson Astronomical Observatory; LL.D. Whittier College, 1913; Sc.D., Occidental College, Los Angeles, Calif., 1921. With the United States Weather Service from 1888-1919. Was climatological commissioner at Seattle Exposition in 1909 where he received a gold medal for meteorology exhibit. Lecturer on meteorology and aeronautics. Ranked Lt. U.S. N.R.F. Author of *Climate and Weather of San Diego*; *Influences of the College Spirit*, 1913; and *Aviation and Weather Bureau*, 1917; also wrote numerous monographs, pamphlets, etc., pertaining to climate and aeronautics. Was the inventor of the hythergraph.

CARPENTER, JOHN ALDEN (1876); American composer. Graduated from Harvard in 1897, and studied music under Bernard Ziehn and Sir Edward Elgar. Received decoration of the Legion of Honor in France, 1921. He composed *Sonata* for violin and piano, 1912; *Gitanias*, for orchestra and piano, 1915; and several published songs. He wrote *The Birthday of the Infanta*, a ballet-pantomime produced by the Chicago Opera Company, 1919-20.

CARPENTER, MARY (1807-77), Eng. social reformer; founder of reformatory schools in England; devoted her life to the services of destitute children, and was largely instrumental in improving the administration in regard to elementary education.

CARPENTIER, GEORGES (1894); Fr. professional boxer, entered the ring at an early age, and after numerous successes, in 1913 fought Bombardier Wells, at that time heavy-weight champion of Britain, at the National Sporting Club, London, for the heavy-weight championship of Europe, defeating him sensationally in 73 seconds. In 1919, in defense of his title, he repeated his success by knocking out Joe Beckett, the present Eng. champion, in 74 seconds. He was defeated by Jack Dempsey, in 1921, and by Siki, a Senagalese in 1922.

CARPENTRAS (44° 3' N., 5° 3' E.); town, on Auzon, Vaucluse, France; Rom. arch; has fragments of ancient fortifications; cathedral, 1405; silk spinning, cottons and woollens. Pop. 11,000.

CARPENTRAS

CARPENTRY, the trade of one who constructs the wooden framework of buildings as distinct from joiner's work, which is of a lighter character, (i.e.) doors, windows, etc. In shipbuilding c. includes joinery. In theatres the stage carpenter constructs the wooden framework of scenery.

CARPETS, textile floor-coverings, of which the principal styles are Persian, Turkey, Kidderminster, Brussels, Wilton, Tapestry, and 'royal' and 'patent' Axminster. When carpets were first used cannot be exactly ascertained, but it is clear, from fragments which have been discovered, that they were in use amongst the Egyptians at a very early period, and they were most certainly used by the early Greeks and Romans.

Persian and Turkey 'pile' carpets are of very ancient manufacture, and are made upon primitive looms by a process of knotting on warp threads tufts of woollen yarn, which are held together by the weft. As the carpet in a Persian palace or dwelling was the principal article of furniture, and was used for table, chair, and bed, it naturally followed that, apart from its decorative use, it should be made as soft and comfortable as was possible. Hence the wonderful pile carpets which came from these Eastern looms, remarkable also for their durability. Carpets are to be found in Pers. palaces at the present time which have been in constant use for three hundred years. Indian pile carpets are made by same process as those of Persia, and the early ones have similar designs; modern Indian carpets are less beautiful, owing to Western influence, which has debased the patterns.

In regard to carpets of Brit. make, reference must first be made to Kidderminster carpets, which were the first machine-made carpets. They have no pile, and are reversible, the yarn threads lying flat upon the surface. Brussels carpet is made by a process of interweaving threads in the warp with a linen network; Wilton, or 'velvet pile', is made in a similar manner, but the loops are cut and so form a yielding surface; Tapestry carpet, invented at Edinburgh, 1832, is similar to Brussels in that its surface is composed of looped worsted yarn; and the two makes of Axminster are produced by the use of wool chenille upon a basement of hemp, linen, or cotton.

CARPOCRATES, II.-cent. Gnostic; member of a licentious sect who claimed to have only true knowledge of religion; personal actions, good or bad, were matters of indifference, according to their creed, and the cultivation of the passions was to be commended; said to have been a Jew of Alexandria.

CARPS (*Cyprinidae*), an important family containing about 1,300 species, many of them game-fishes. They have toothless mouths, but specialized teeth on the lower pharyngeals, small barbels or none; are generally of small size, with large scales, and are exceedingly prolific; found in rivers and ponds all over the world, except Australian region, Madagascar and S. America. In Britain there are 16 species, some being favorite angling fishes; the Roach, absent from Ireland; the Rudd or Red-eye, which replaces it there as a sporting fish, though it is less common in Great Britain; gregarious Minnow—all species of Leuciscus, as are also the Chub and Dace (*g.v.*). Others are the Bream (*Abramis brama*)—a familiar 'coarse fish' which may weigh 12 lb.; the Bleak (*Alburnus lucidus*), absent from Scotland and Ireland, from the scales of which artificial pearls are made; the minute 4-inch-long shy Loach (*Nemachilus barbatulus*); and the largest of the family is the Mahaseer, or Maheer (*Barbus mosal*), an Ind. food and game-fish, which may be 6 ft. in length and bear 'scales as large as the palm of the hand.'

CARR, GENE (1881), American cartoonist. He was educated in public schools and although he never studied art was an illustrator and caricaturist and was employed in that capacity on leading newspapers including the New York Recorder in 1894, and later on the Philadelphia Times, New York Herald, New York Journal and the New York World. The comic series, *Lady Bountiful*, *Phyllis*, *Romeo*, *All the Comforts of Home*, *The Prodigal Son*, *Father*, *Willie Wise*, *Stepbrothers*, *Bill*, *The Jones Boys*, *Flirting Flora*, *Reddy and Caruse*, and *Metropolitan Movies* in the Morning World, N. Y., were created by him.

CARR, WILBUR JOHN (1870), American public official. Graduated from the Commercial College of Kentucky University, Lexington, 1889; LL.B. Georgetown University, 1894; LL.M., Columbian (now George Washington) University, 1899. Was admitted to the bar in 1901. He held the position of clerk, chief of Consular Bureau and later chief clerk of the Department of State and was the representative of that department on the United States Board of the Jamestown Expn., 1907, also vice-chairman of committee on foreign relations of the National Research Council. Was a contributor to the encyclopedia Americana, American Journal of International Law and other periodicals.

CARRACCI, LUDOVICO (1555-1619), and his nephews, Agostino (1557-1602) and Annibale (1560-1609), Bolognese artists, founders of Eclectic school, which looked to Michelangelo for movement, Raphael for composition, the Venetians for color, and Correggio for light and shade; nine works in National Gallery.

CARRANZA, VENUSTIANO (1859-1920), Mexican president, led revolt against Garza Galan, governor of Coahuila, 1893, and on establishment of peace, 1910, succeeded Galan as governor. After the murder of President Madero, 1913, and the fall of his successor Huerta, Carranza became chief of the constitutionalist army, and in Sept., after having organized local and federal governments, as provisional president established his capital at Hermosillo; moved his government to Vera Cruz, 1914, and recognized as president, 1915; rebellion under Obregon, May 20, 1920; Carranza fled to Cuautempam, in the state of Puebla, where he was treacherously shot by Rodolfo Herrera while sleeping.

CARRARA (CARRARESI), tyrants of Padua in XIV. cent.; Jacopo da Carrara (a village near Padua), elected lord, 1319; Cangrande della Scala took Padua from Jacopo's nephew, who recovered it, 1336; his nephew Ubertino, great patron of arts; Francisco, lord, 1350-92, unsuccessful in war, d. a Milanese prisoner; his s. recovered Padua, 1390, but he and house fell before Venetians.

CARRARA (45° 5' N., 10° 5' E.), cathedral town, Tuscany, Italy; famous for white marble (*q.v.*) quarries since Roman times. Pop. 19,000.

CARRE, HENRY BEACH (1871), American clergyman. Graduated from Tulane University, La., in 1895; B.D. Bible Dept. of Vanderbilt University, 1898. Also studied at universities at Berlin and Marburg in Germany from 1898 to 1900 and received Ph. D. from University of Chicago, 1913. Ordained a minister of the M. E. Ch. S., 1893, and was president of Centenary College of La. 1902-3. Was made President of the Tennessee Anti-Saloon League in 1911. Served overseas with the Y.M.C.A. Member Phi Beta Kappa. Author of *Paul's Doctrine of Redemption*.

CARREL, ALEXIS (1873), Fr. surgeon; appointed head of the Rockefeller Institute for Medical Research, 1909, where he carried on experiments having for their aim the alleviation of suffering; returned to France on outbreak of World War, and, with Henry D. Dakin, the well-known Eng. chemist,

devised a scheme for the more effective sterilization of extensive wounds, known as *La Methode d'irrigation intermittente Carrel*. This method has proved signally successful in every way, and the rate at which, under this treatment, a wound will heal can be foretold with almost mathematical accuracy. Winner of Nobel prize in 1912.

CARREL, JEAN BAPTISTE NICOLAS ARMAND (1800-36), Fr. soldier and journalist; became sole editor of *Le National*, the democratic mouthpiece; killed in duel.

CARREÑO, TERESA (1853-1917), Venezuelan pianist, was b. at Caracas. She first studied under her f., and in 1862 she made her first appearance in New York. Later she went to Paris to study and since then she played in the chief cities of Europe and America. She married and was subsequently divorced from Emile Sauret, the violinist, Tagliapietra, the singer, and Eugene d'Albert, the pianist, in 1902 marrying her second husband's younger brother. She is composer of the Venezuelan national anthem. Her playing was chiefly remarkable for its verve and brilliancy, and extreme vigor, this latter characteristic winning for her the appellation of 'the Valkyr of the piano.' She d. in New York.

CARRERE, JOHN MERVEN (1858-1911), architect, was b. in Rio de Janeiro, American parents. He was educated in Switzerland, later studying architecture for four years in Paris. He returned to America, and after two years spent in the office of McKim, Meade and White, of New York, he went into partnership with Thomas Hastings, the firm rapidly gaining a highly favorable reputation for the artistic and imaginative quality of their work. Their first important commission was the Ponce de Leon Hotel at St. Augustine, Fla., followed by the Alcazar in the same place. They were the architects of the New York Public Library, erected at a cost of over \$8,000,000 from designs which won the prize in a competition in which the foremost architects of the country took part.

CARRIACOU, largest of the Grenadines, W. Indies; area, 6,913 acres. Pop. 7,000.

CARRIAGE, a vehicle for carrying goods or persons, usually on wheels, and employed from the earliest historic times; anciently called chariot, or car. A famous example of the chariot was the gold and jeweled mounted chariot discovered in the tomb of King Tutankhamen in Egypt in 1923. Another famous example was the funeral car designed by Hieronymus to convey the

body of Alexander from Babylon to Alexandria. It occupied two years in building; was 18 ft. long by 12 ft. wide, mounted on massive wheels, and drawn by 64 mules. The Roman chariots, closed in front and open behind, were often profusely ornamented with gold and precious stones. The war chariots of the ancient Britons, open in front and closed behind, had scythes bound to the axle-trees. Although some sort of vehicle was in use in England in mediæval times, and carriages were known in Europe at least at the beginning of the 15th cent., the earliest coach in England was built for the Earl of Rutland in 1555. By 1601 these vehicles were so commonly used as to provoke complaints from the Thames watermen, and early in the 17th cent. there were over six thousand in the neighborhood of London. Hackney coaches were instituted in London in 1625. Steel springs were first used about 1670, before which time the body of the carriage was suspended from straps. The hansom cab was introduced in 1834, and indiarubber tires in 1852. The Victorian era was pre-eminently the period of the private carriage: four-wheeled—brougham, landau, victoria, four-in-hand; two-wheeled—stanhope, tilbury, gig, and dog-cart. The carriage is rapidly disappearing in favor of the motor-car.

CARRICKFERGUS (54° 43' N., 5° 48' W.), seaport, N. side Belfast Lough, County Antrim, Ireland; formerly a walled town; has XII.-cent. castle; landing-place of William III., 1690; flax spinning, and oyster fisheries. Pop. 4,200.

CARRIER, term for any persons or company conveying goods for hire by land or by water.

CARRIER PIGEON. See PIGEON.

CARRINGTON, HENRY BEEBEE (1824-1912), American soldier and historian, was born at Wallington, Conn., and educated at Yale, later studying law and practicing in Columbus, Ohio. He assisted in the organization of the militia of that state, and at the outbreak of the Civil War, was made a colonel of the 18th U.S. Infantry and afterwards brigadier-general of volunteers. In 1870 he became professor of military science in Wabash College, Indiana. In 1890 he organized a census of the Six Nations and the Cherokee Indians. His book, *Battle of the American Revolution* is generally considered to be one of the best military histories of the War of Independence.

CARRINGTON, HERWARD (HUBERT LAVINGTON) (1880), American

writer; educated at Samson's and Philological schools, London and Cranbrook, Kent, England. Ph.D. Okaloosa, Ia., 1918. Came to America in 1899. Editor of *Street and Smith's novels*, 1906-7. Author of *The Physical Phenomena of Spiritualism*, 1907, and later, other works pertaining to spiritualism. Also wrote *Death—its Causes and Phenomena*, 1911 and *Death Deferred* in 1912, followed by *The Natural Food of Man* and several publications on physiology together with *True Ghost Stories* and numerous books on tricks and magic. Wrote *Modern Psychic Phenomena*, 1919, and *Your Psychic Powers and How to Develop Them*, 1920. Was editor of a scientific page in *Leslies Weekly* and of the *Psychical Review*, also contributed to magazines, and scientific articles to *The American Encyclopedia (Supplement)* and the *Standard Dictionary*.

CARROLL, CHARLES, 'of Carrollton' (1737-1832), Amer. statesman; ed. in France; adopted designation 'of Carrollton' from family estate; one of delegates sent to persuade Canadians to join war, 1776; signed Declaration, Aug. 2, 1776; U.S. Senator, 1789; one of Md. and Va. boundary commission, 1799.

CARROLL, JOHN (1735-1817), abp. of Baltimore; prominent and influential in R.C. body in U.S.A.

CARROLL, RAYMOND G. (1877), Amer. newspaper correspondent. Studied at Hobart College, Cornell University and Syracuse University. Connected with editorial departments of several newspapers, was on the staff of the N.Y. *Evening World*, 1900-12 and later Paris correspondent for that paper. Traveled through Europe, India and Egypt as correspondent and also through Mexico and South America. Was war correspondent with the A.E.F. in France from 1917 to the close of the war. Contributed short stories and serials to newspapers and magazines under the name of 'Arnold Garrycoln.'

CARRONADE, heavy ship's gun, designed by General Melville in 1759, and called a 'smasher.' Though not used in the Brit. navy until 1779, it had been manufactured for some time at the Carron Iron-works, in Stirling-shire, whence it got its later name; calibre from 12 to 68 lb.; mounted on a carriage without trunnions, moved on a slide; as naval weapon long obsolete.

CARROT (*Daucus carota*), vegetable; order *Ambelliferae*; its reddish roots used as vegetable and cattle food.

CARROUSEL, PLACE DU, Parisian square with monument to Gambetta; named from fête given by Louis XIV. 1662.

CARRUTH, (FRED) HAYDEN, (1862), American writer. Attended University of Minnesota, 1881-2. He conducted the Estelline Bell, in Dakota from 1883 to 1886, wrote editorials for the New York Tribune from 1888-92, and was connected with Harpers Magazine in the capacity of an editor from 1900-2. He later went with the Woman's Home Companion. In addition to his contributions to various magazines he wrote: *The Adventures of Jones*, 1895; *The Voyage of the Rattletrap*, 1897; *Mr. Mile Bush and Other Worthies*, *Their Recollections*, 1899; and *Track's End* in 1911.

CARS, ELECTRIC. See AUTOMOBILE.

CARS, GASOLINE. See AUTOMOBILE.

CARS, STEAM. See AUTOMOBILE.

CARSE, Scot. geographical term for low-lying fertile regions, generally in river beds: (e.g.) C. of Gowrie in Perthshire and Forfarshire, and C. of Stirlingshire in valley of Forth.

CARSIOLI (c. 42° 10' N., 13° E.), ancient city, Via Valeria, Italy.

CARSON, CHRISTOPHER (1809-68), better known as 'Kit Carson,' American trapper and guide; born Madison co., Ky. His family emigrated to Howard county, Mo., where at the age of 15 he was apprenticed to a saddler. He joined a hunting expedition when 17 and spent the next 16 years as a hunter and trapper, winning a wide reputation for courage and resourcefulness in his hazardous calling. He served as guide to Fremont on his exploring expeditions and in 1847 received an appointment as lieutenant in the rifle corps of the regular army. He served with credit in the Civil War and was made brevet brigadier general.

CARSON, EDWARD HENRY, BARON (1854), Irish Unionist politician and leader; solicitor-general for Ireland, 1892; joined English bar, 1893; solicitor-general 1900-6, attorney-general, 1915; first lord of Admiralty, 1917; member of War Cabinet, 1917-18; leader and inspirer of Ulster Anti-Home Rule campaign, 1912-13; accepted reluctantly the Home Rule Bill of 1920. He was created Baron of Duncairn in 1921.

CARSON CITY, a city of Nevada, of which it is the capital, the county seat of Ormsby co. It is on the Virginia and

Truckee Railroad, 32 miles S.E. of Reno. In the early days of mining in Nevada, Carson City was the most important mining community in the State. With the exhaustion of the famous mines its prospecting has diminished. It is the seat of a branch of the United States mint. Its industries include several machine and railroad repair shops. Here are also the State House, State Prison, Orphans' Home, and an Indian school. From its situation and the beauty of the surrounding scenery, Carson is famous as a summer resort. It is 10 miles from the famous Lake Tahoe. Pop. about 2,000.

CARTAGENA, CARTHAGENA (37° 35' N., 0° 56' W.), fortified port and great naval arsenal, S.E. Spain, on Mediterranean; large harbor; exports metals and metal ores, fruits, wine, etc. 'New Carthage' was founded by Hasdrubal (q.v.), 242 B.C.; episcopal see; XIII.-cent. cathedral, old castle, observatory; besieged, 1873-74. Pop. 102,500.

CARTAGENA, CARTHAGENA (10° 22' N., 75° 32' W.), fortified seaport city, capital of Bolívar, Colombia, S. America; on sandy island, connected with mainland by bridges; has good harbor, but since rise of Sabanilla commercial importance has declined; canal to Calamar reopened, and return of prosperity is probable; cathedral and univ. founded, 1533; burned by Drake, 1585; exports cattle, tobacco, sugar. Pop. 51,000.

CARTAGO (9° 54' N., 83° 41' W.), capital of C. province, Costa Rica, Cent. America, at foot of volcano Irazu; produces coffee and bananas. Pop. 6,000.

CARTE BLANCHE (Fr. 'blank card'), card signed by person permitting recipient to inscribe upon it his own conditions; hence, a free hand.

CARTE, THOMAS (1686-1754), Eng. historian; pub. *Life of the Duke of Ormonde*, 1736; *History of the Revolutions of Portugal*, 1740; *History of England*, 4 vols. 1747-55. His writings are careful, learned, and dull.

CARTEL, written agreement as to exchange of prisoners; challenge to fight.

CARTER, ELIZABETH (1717-1806), Eng. poetess and miscellaneous writer; probably the most learned woman of her time; she was proficient in Greek, Latin, Hebrew, Arabic, and all modern European languages; pub. *Poems on Particular Occasions*, 1739; *Poems on Several Occasions*, 1762; trans. Epictetus, 1758; was friend of Dr. Johnson, Walpole, Richardson, and Burke.

CARTER, HENRY ROSE (1852),

CARTER

Amer. sanitarian. Graduated from the University of Virginia as a Civil Engineer in 1873 and took a postgraduate course at that college in mathematics and applied chemistry, 1874-5. M.D., University of Maryland School of Medicine, 1879. He was mainly interested in sanitation in connection with yellow fever and malaria, beginning his investigations at the Ship Island Quarantine Station on the Gulf of Mexico in 1888. He made a special study of impounded waters as affecting malaria and his discovery in 1901 of extrinsic incubation led to the later discovery that mosquitoes are carriers of yellow fever. Was made asst. surgeon general of the U.S. Public Health Service by a special act of Congress in 1915. Inaugurated quarantine system in Cuba, 1899-1900. Sanitary advisor of the Peruvian Government, 1920-21. He wrote many articles in Public Health Reports and medical journals pertaining to impounded water, yellow fever and malaria.

CARTER, HOWARD (1872), British archaeologist. He became of note as an Egyptologist by his excavations in the Valley of the Kings, Egypt, in search of royal tombs and other evidences of the vanished civilization of the Pharaohs. He was only eighteen when he began his first researches on the site of Thebes, the ancient capital of Egypt, and thenceforth devoted his career to archaeological exploration. Some of his most noteworthy discoveries were made in association with Theodore M. Davis of Boston, who from 1907 to 1914 unearthed six royal tombs and a wealth of rare and valuable antiquities. Later he became associated with the Earl of Carnarvon in painstaking and often fruitless digging in Luxor. His famous discovery in 1923 of the tomb of a Pharaoh, King Tut-ankh-amen (q.v.), who reigned more than 3,000 years ago, was the culmination of thirty-three years of continuous research and excavation.

CARTER, JOHN RIDGELY (1864), graduated from Trinity College, Conn. 1883 and received A.M. from that college in 1885; L.L.D., 1911. He also studied at Leipzig in 1884; graduated from the Law School of the University of Maryland, 1887, and Harvard Law School in 1888. Was admitted to the bar in 1889. Secretary of the American Embassy to London, 1905-9. Envoy Extraordinary and Minister Plenipotentiary to Roumania, Servia and Bulgaria from 1909 to Oct. 1910 at which time he temporarily took charge of the embassy at Constantinople, being accredited as M.P. and remaining in charge there until

CARTERET

June 4, 1911. He became associated with the firm of J. P. Morgan & Co. in 1912 and was made a partner of the Paris branch of that firm, Morgan Harjes & Co. in 1914.

CARTER, (LOUISE) LESLIE (1862); actress, was born at Lexington, Ky. and made her first appearance on the stage in 1890 in *The Ugly Duckling*. Afterwards she appeared in a musical comedy, *Miss Helyett*, later retiring from the stage in order to devote herself seriously to the study of her profession in New York. In 1895 she created an immense sensation as Maryland Calvert in *The Heart of Maryland*, repeating her American success in London some three years later. She then played in *Zaza*, this play enjoying a long run, and followed this success with another in *Du Barry*, in which she played for three years. In 1906 she broke her connection with Belasco's management, and entered into management on her own account. She retired from the stage some time after, going to Paris to reside, but in 1921 was induced to come to New York to play Lady Kitty in Somerset Maugham's *The Circle*, a role in which she scored an immense success.

CARTER, WILLIAM HARDING (1851), studied at various public and private schools in Nashville, Tenn., and later attended the Kentucky Military Institute at Frankfort. During the Civil War he served as a mounted messenger, 1864-5. Deciding upon a military career he obtained an appointment to the United States Military Academy and graduated in 1873 as a 2nd Lt. In 1879 he was made a 1st Lt.; 1889, a Capt.; Maj. Asst. Adj.-Gen., 1897; Lt. Col., 1898; Colonel, April 1902; Brig.-Gen., June 1902, and Major-General in 1909. He retired by operation of the law Nov. 19, 1915 but was recalled for active service after the U.S. entered the World War in 1917. Was awarded the Congressional Medal of Honor in 1881 and the Distinguished Service Medal for his services during the World War. In addition to contributing professional articles to magazines and encyclopedias he was the author of: *From Yorktown to Santiago with the Sixth Cavalry*, 1900; *Old Army Sketches*, 1906; *Giles Carter of Virginia*, 1909; *The American Army*, 1915; *Life and Services of Lieutenant General Chaffe*, in 1917, and others.

CARTERET, SIR GEORGE (1610-80), Eng. Royalist; b. Jersey; s. of Helier de Carteret; was made Lieut.-Gov. of Jersey by Charles I.; later the island became the refuge of Prince Charles, after his flight from Scilly, and of many other Royalists. O. was compelled to

surrender to Parliament after a long siege in 1651. He then sought refuge in France, but, after the Restoration, held various offices under Charles.

CARTERET, PHILIP (d. 1796), Eng. explorer who discovered several Pacific islands, one of which is named after him.

CARTHAGE (36° 53' N., 10° 5' E.), famous ancient city, N. Africa, situated N. of Tunis on peninsula jutting into Mediterranean. C. was first established as trading station by Phoenicians c. IX. cent. B.C.; became great commercial center; engaged in struggle in Sicily in V. cent. B.C.; many of Sicilian cities were then centers of Gk. civilization; Gelo of Syracuse defeated Carthaginians, 480 B.C. Towards end of cent., C. made another attempt on Sicily; eventually driven back by Dionysius the Elder; again defeated by Timoleon of Corinth, 343 B.C.; later renewed attempt; in III. cent. B.C. captured considerable dominions in island. C. came into conflict with Rome c. 264 B.C., when first Punic War broke out; this began in Sicily and became contest for possession of that island; war ended 241, when C. was utterly defeated and had to cede Sicily to Rome. City was greatly injured by insurrection soon afterwards.

Second Punic War broke out, 219; Hannibal (q.v.) inflicted terrible defeats on Rome; Carthaginians eventually defeated by Scipio at *Zama*, 201 B.C.; C. became dependent state; had to give up all European territories, also had to pay annual tribute to Rome for fifty years and to agree to wage no war without Rome's consent. C. continued to prosper, thus exciting jealousy in Rome, which in 149 B.C. seized opportunity given by the fact that C. had taken up arms against Numidia to declare war. Third Punic War ended in 146 B.C., when C. was utterly destroyed by Romans, and became Rom. province; later city on site, important Rom. city; ruined by Arabs, 647 A.D.

CARTHAGE, a city of Missouri, the county seat of Jasper co. It is on the St. Louis and San Francisco, and the Missouri, Pacific railroads, and is 300 miles S.W. of St. Louis. Carthage is the center of an important lead and zinc mining region. Its industries include the manufacture of stone, lime, flour, and iron products. It has a public library, several parks, churches, etc. Carthage was the center of a battle fought July 5, 1861 between the Union army in command of General Sigel and the Confederate forces under General Parson and General Rains, in which the Union army was defeated. Pop. 1920, 10,068.

CARTHUSIANS, monastic order white habit, founded by St. Bruno (b. 1030, Cologne; d. 1101) at La Grande Chartreuse, near Grenoble, France, in 1086. The rules of the order are very severe; meat is never eaten; fasting is frequent; and the monks spend the greater part of their time in the solitude of their separate hermitages. At the period of the Fr. Revolution the property of the C's was confiscated, but upon their return to France in 1816 as a means of subsistence they commenced the manufacture of the famous liquor with which their name is associated. They were again expelled from France in 1903.

CARTIER, SIR GEORGE ÉTIENNE, Bart. (1814-73), Canadian statesman; from 1858-62 was, with Sir John Macdonald, joint-Premier of Canada; had much to do with the promotion of the Grand Trunk and Canadian Pacific Railways.

CARTIER, JACQUES (1491-1557), Fr. navigator; made three voyages to America, and discovered the St. Lawrence River. See CANADA.

CARTILAGE, or **GRISTLE**, tough, elastic, connective tissue, varying in different parts of the body. (1) Bluish-white, somewhat transparent hyaline cartilage of larynx and chest; (2) white fibro-cartilage between joint surfaces; (3) yellow elastic cartilage found in ear and epiglottis.

CARTOON (Ital. *cartone*, pasteboard). In painting, study or design, drawn in full size upon strong paper, to serve as model for transferring or copying, and used in the making of mosaics and tapestries, and in fresco-painting. For the last-named purpose the figures were formerly cut out and fixed upon the wall-space, and their outlines traced in the plaster with a pointed instrument. Notable examples by the old masters are those by Raphael (in South Kensington Museum), and others by Leonardo da Vinci and Michelangelo, which now only survive in engravings. In modern times the term is generally applied to political and satirical drawings.

CARTOUCHE (Fr.), roll of paper or other material containing charge of powder and shot for hand firearms; the later word 'cartridge' is a corruption of the foregoing; also, in arch., the volute of Ionic capital.

CARTRIDGES. See AMMUNITION.

CARTWRIGHT, EDMUND (1743-1823), Eng. inventor; bro. of John Cartwright (q.v.); poet, rector of Goadby-Marwood, and prebendary of Lincoln.

CARTWRIGHT

later entered commerce, and invented the power-loom, for which Parliament voted him \$50,000.

CARTWRIGHT, JOHN (1740-1824), Eng. political reformer; entered navy, and served under Hawke, Byron, and Palliser; major of Nottinghamshire Militia for seventeen years; worked for universal suffrage and annual parliaments.

CARTWRIGHT, THOMAS (1535-1603), Eng. Puritan; Lady Margaret prof. of Divinity, and Fellow of Trinity College, Cambridge, both of which offices he was deprived of by John Whitgift, vice-chancellor, because of his opinions regarding the Anglican Church; several times imprisoned for religious opinions.

CARTWRIGHT, WILLIAM (1611-43), Eng. dramatist; ed. Oxford, and took orders; junior proctor 1643; was intimate with Ben Jonson; wrote *The Royal Slave*, music by Lawes; acted at Christ Church before King and Queen, 1636; *The Lady Errant*; *The Siege*; and *The Ordinary*.

CARTY, JOHN J. (1861), an American electrical engineer, born at Cambridge, Mass. He began with the Bell Telephone Co., Boston in 1879 but left in 1887 to take charge of the cable dept. of the Western Electric Co. Two years later he became the chief engineer of the New York Telephone Co. and in 1889 resigned to accept the position of chief engineer of the American Telephone and Telegraph Co., of which he was made vice-president in 1919. He invented many improvements and received three medals, including the Edison, for his achievements in connection with the development of the telephone. Served in France during 1918-19, on the staff of Brig. Gen. Edgar Russell and was Chief Signal Officer of the A.E.F. with the rank of Col. U.S.A.

CARUPANO (10° 36' N., 63° 16' W.), seaport town, state Bermudez, Venezuela; coffee, sugar. Pop. 10,000.

CARUS, KARL GUSTAV (1789-1869), Ger. anatomist, physiologist, and psychologist; lecturer on comparative anatomy at Leipzig 1811, director of a military hospital 1813, and prof. in coll. of med. at Dresden 1814; author of numerous works, and an authority on art, etc.

CARUS, MARCUS AURELIUS (282-33 A.D.), Rom. emperor; prefect of Prætorian guards; succ. Probus as emperor; undertook an expedition against Persians; conquered Mesopotamia.

CARUSO, ENRICO (1873-1921), Ital.

CARY

operatic tenor; born Naples. As a boy, he sang in churches in his native city, and while serving in the army his remarkable gifts attracted the attention of an officer, who helped him to secure a musical education. His debut was made in L'Amico Francesco at Naples in 1895, but it was three years later before audiences began to realize that they were listening to the greatest tenor of all time. He toured Europe and South America, being received everywhere by packed and enthusiastic audiences. His first appearance in America was at the Metropolitan Opera House, New York in 1903 in *Rigoletto*. From that time to the day of his death he was the idol of music lovers, and no tenor before or since has ever been so popular. His repertoire included more than 40 operas. He last appeared in *La Juive*, Dec. 24, 1920, even then suffering from the illness which caused his death in the following year.

CARVAJAL, ANTONIO FERNANDEZ (d. 1659), Portug. Jew; settled in England during reign of Charles I. He was the first naturalized Eng. Jew, and was often employed by Cromwell in political matters.

CARVAJAL, LUISA DE (1568-1614), Span. lady who conducted a R.C. propaganda in England; owing to friction with England was recalled, but d. in London before she could return.

CARVER, JOHN (d. 1621), was one of the 'Pilgrim Fathers,' and first gov. of their colony.

CARVER, JONATHAN (d. 1780), Amer. traveler; pub. in London *Travels through the Interior Parts of North America in the Years 1766-68*, which was trans. into German, French, and Dutch.

CARY, ALICE (1820-1871), American poet; born Cincinnati, Ohio. She began early to write for the press, and in 1850 published, in conjunction with her sister Phoebe, *Poems by Alice and Phoebe Cary*. Among her individual works published later were *Clovernook*, 1851-53; *Lyra and Other Poems*, 1853; *Married, Not Mated*, a novel, 1856; *The Lover's Diary*, 1867, and *Snow Berries*, 1869. For more than fifteen years she and her sister maintained in New York what was the nearest approach to a literary salon the metropolis had known.

CARY, ANNIE LOUISE (Mrs. Charles Raymond) (1842-1921), singer, was born at Wayne, Me., the daughter of Dr. Nelson H. Cary. She studied voice production under Lyman W. Wheeler, in Boston and Giovannia Corsi in Milan. She made her first appearance in opera at Copenhagen, and later, under Stra

kosch and Mapleson, sang the principal contralto and mezzo-soprano grand opera roles in both Europe and America. In 1882 she married Charles Monson Raymond, banker, and retired from the operatic stage.

CARY, AUSTIN (1865), graduated from Bowdoin in 1887, A.M. 1890. Also studied biology at Princeton and Johns Hopkins Universities. 1888-91. He obtained forestry experience in the employ of the Forest Commissioner of Maine and the Forestry Div. of the United States Dept. of Agriculture. In 1898 he became associated with the Berlin Mills Co., as forester and remained in this position until 1904, when he resigned to teach forestry at Yale University. Was asst. prof. of forestry at Harvard from 1905-9, made N.Y. Supt. Forests, 1909 and entered the United States Forest Service in 1910.

CARY, ELIZABETH LUTHER (1867), she was educated under the tutorage of private instructors and studied art for ten years under Charles Melville Dewey and Eleanor C. Bannister. Owned and edited *The Scrip* until 1908 when she formed a connection with the New York Times as editor of the Art Dept. In addition to translating from the French *Recollections of Middle Life* by Francis Sarcey and *Russian Portraits* from the French of Vte E. Melchior Vogue she was the author of *Alfred Tennyson, His Homes, His Friends and His Work*, 1898; *Robert Browning, Poet and Man*, 1899; *The Rossettis, Dante Gabriel and Christina*, 1900; *William Morris*, 1902; *Ralph Waldo Emerson, Poet and Thinker*, 1904; *Artists Past and Present*. in 1908, and others.

CARY, HENRY FRANCIS (1772-1844), Eng. author and translator; b. Gibraltar; ed. Oxford; famous for trans. of Dante's *Divina Commedia*, 1805-14, highly praised by Coleridge; trans. also Aristophanes' *Birds* and Pindar's *Odes*; wrote lives of poets.

CARY, PHOEBE (1824-1871), writer and poet, was born in Cincinnati, Ohio, and died at Newport, R.I. She wrote extensively for the magazines and in collaboration with her sister Alice Cary, like herself endowed with poetic gifts, published several books. She is best known as the author of the popular hymn, *One Sweetly Solemn Thought*.

CARYATIDES, draped female Gk. figures, executed in early times by Praxiteles and others, and used in arch. to support an entablature; in later times such figures were employed as supports of ship's poop and quarterdeck. Male

figures are called 'Atlantes.'

CARYOPHYLLACEÆ, order of dicotyledonous plants; herbaceous; stems swollen at joints; sepals, petals; stamens 5, ovary 1, free central placentas, stigmas 2-5; includes genera: *Dianthus* (Pink), *Lychnis* (Campion), *Saponaria* (Soapwort), *Cerastium* (Chickweed), *Stellaria* (Stitchwort); many favorite garden varieties (e.g.) Carnation, Sweet William.

CASABIANCA, RAPHAEL, COMTE DE (1738-1825), Fr. general; served under the revolutionary government in Italy, 1794-98; made count, 1806; rejoined Napoleon during the Hundred Days.

CASABIANCA, LOUIS (1752-98), nephew of above, succ. Admiral Brueys in command of the *Orient* at battle of the Nile His s., Giacomo, aged ten, was hero of Mrs. Hemans' *The Boy stood on the Burning Deck*.

CASABLANCA (33° 37' N., 7° 34' W.), seaport, Morocco, on Atlantic coast; Arab. Dar-el-Baida; exports, wool, wax, maize, goat-skins; imports, sugar, cotton, calico; bombarded and occupied by French, 1907. Pop. 10,500.

CASALS, PABLO (1876), first studied music under his father and later was a pupil on the cello of Thomas Breton and also Garcia, Jesus de Monasterio. Was professor of the cello at Barcelona U. until 1898 when he made his debut as a soloist in Paris, France. First appeared in the United States in 1901 and made many tours throughout the country thereafter. He composed many selections for the cello and organ, also orchestra numbers and was recognized as a master.

CASANOVA, GIOVANNI JACOPO (1725-98), Venetian adventurer; of good birth and brilliant parts; actor in early life, later abbé, journalist, diplomatist. He traveled widely in Europe, and was decorated with the order of the Golden Spur by the pope.

CASAS GRANDES (30° 5' N., 108° 3' W.), town, Mexico; ancient Ind. settlement; extensive ruins.

CASAUBON, FLORENCE MERIC (1599-1671), Eng. scholar; s. of Isaac C. (q.v.); declined Cromwell's invitation to write history of Civil War; edit. *Meditations* of Marcus Aurelius, and wrote several original works.

CASAUBON, ISAAC (1559-1614), Fr. scholar; b. Geneva, of Huguenot parentage; prof. of Greek at Geneva, and later at Montpellier; royal librarian in Paris to Henry IV. 1598, but after assassina-

tion of king came to London, and was made Prebendary of Canterbury, 1610. C. possessed little originality as a writer, but had amassed a wonderful store of learning, and his merits as a commentator are very great. He edited Aristotle, Diogenes, Lærtius, Theophrastus, Strabo, Theocritus, Polybius, Persius, and Suetonius.

CASCADE MOUNTAINS (45° N., 121° W.), mountain range, extending northwards through Oregon and Washington into Brit. Columbia; principal peaks about 14,000 ft.; numerous extinct volcanoes; heavily and extensively wooded; name derived from cascades formed by Columbia River in cutting way through range.

CASCARILLA BARK, the bark of *Croton eleuthera*, a shrub of order Euphorbiaceæ, indigenous to the Bahama Islands; has a pleasant, aromatic odor and bitter taste; used in med. and in incense.

CASCO BAY, Maine, body of water on the S.W. coast of Cumberland co. It is irregular in shape and its greatest length is about 25 miles. The water is very deep and affords one of the finest harbors in the world. It is very beautiful and is dotted with islands, about 300 in number. Portland is located on its western side.

CASE, ANNA (1893). Attended public schools at South Branch, N. J. and received vocal training under Mme. Augusta O. Renard of New York City. Began as a church singer at Plainfield, N.J. Made her debut with the Metropolitan Opera Co. as a Dutch boy in *Werther* in 1909 and continued as a member of that company appearing in many roles including Sophia in *Der Rosenkavalier*; Olympia, in *Tales of Hoffman* and Micaela in *Carmen* and others. Also made many successful appearances on the concert stage in the United States and Canada.

CASE SCHOOL OF APPLIED SCIENCE, at Cleveland, Ohio, organized March 29, 1880. It offers six regular courses of study, each occupying four years. These are physics, chemistry, civil engineering, electrical engineering, mining engineering and mechanical engineering. The endowment is about \$2,500,000, and the buildings and equipments represent an investment of \$1,000,000.

CASEIN OF MILK. An important proted forming about 3 per cent of the total weight of milk, or one-quarter of its solid matter. It is kept in the condition of an opalescent solution by the

phosphate of lime with which it appears to be in combination. It may be precipitated by rennet, by mineral acids and by some salts. Not only is it an important article of food, but its industrial uses are many. It forms the basis of some forms of artificial ivory and is also extensively used in the manufacture of coated paper. Minor uses are in the preparation of cements and adhesives.

CASEMATE (military), bomb-proof chamber; (arch.) moulding in cornice.

CASEMENT, ROGER (1864-1916). Brit. consular servant; served in Port. E. and W. Africa, Fr. Congo, San Paulo, Rio de Janeiro; investigated rubber industry in Putumayo, 1909-12; knighted 1911; during World War was in Germany urging Irish prisoners to serve against Britain; captured off coast of Kerry, April 21, 1916; tried for high treason, and executed, Aug. 23, 1916.

CASERTA (41° 3' N., 14° 22' E.), town (and province), Campania, Italy; magnificent palace, founded by Charles III., 1752, and old cathedral; large silk works in vicinity. Pop. 33,000. Prov. area, 2,033 sq. miles. Pop. 818,000.

CASE-SHOT, military projectile, consisting of light metal case containing bullets; originally called 'canister-shot.'

CASHEL (52° 31' N., 7° 53' W.), city, Tipperary, Ireland; seat of R.C. abp. and Prot. bp.; many interesting ruins, comprising XII.-cent. cathedral, castle, chapel, round tower, ancient cross, exist on 'Rock of Cashel'; famous 'Synod of Cashel' held here in 1172; Henry II. received homage of king of Limerick at Cashel.

CASHMERE. See **KASHMERE**.

CASH REGISTER. See **CALCULATING MACHINES**.

CASILINUM (41° 7' N., 14° 13' E.), ancient city, Campania, Italy; modern Capua.

CASIMIR III., THE GREAT (1310-70), king of Poland; s. of Vladislaus Lokietek; after a somewhat licentious youth he became a beneficent ruler, and a firm and wise political and social reformer. He was the founder of Cracow Univ. 1364.

CASIMIR IV. (1427-92), king of Poland; member of the Jagiello family, and distinguished for his moderation and political sagacity; one of the greatest rulers of his period, his private life was marked by great austerity, while his unbounded generosity to his dependents was proverbial.

CASIMIR - PERIER, JEAN PAUL PIERRE (1847-1907), 5th Fr. pres.; elected 1894 after assassination of Pres. Carnot, but resigned after six months.

CASINO (Ital.), pleasure-house; now usually applied to a gaming-saloon, as that at Monte Carlo; name of a card-game.

CASKET LETTERS, see **MARY, QUEEN OF SCOTS**.

CASORIA. (1) (40° 53' N., 14° 17' E.) town, Naples, Italy. Pop. 13,000. (2) (41° 20' N., 14° 6' E.) town, Torre de Lavoro, Italy.

CASPARI, KARL PAUL (1814-92), Ger. theologian and scholar; best known as author of an *Arabic Grammar*; also wrote commentaries on Old Testament, etc.

CASPER, a town of Wyoming, the county seat of Natrona co. It is on the Chicago, Burlington and Quincy, and the Chicago, Northwestern railroads, and on the Platte River. It is the trade center of a community rich in wool, livestock and oil. Casper is the seat of the Wyoming General Hospital and its other public institutions include a library. Its chief industry is a large petroleum by-products plant. Pop. 1920, 11,447.

CASPIAN SEA, on borders of Europe and Asia (43° N., 49° 30' E.), and surrounded E., W., and N. by Russia and S. by Persia; is largest inland sea in the world; length, 760 m.; breadth, 130 to 300 m.; area, 170,000 sq. m. It is 90 ft. below sea-level, is tideless, has no outlet; shallow in N., (3 to 12 fathoms); deeper in S., (420 to 516 fathoms); northern part frozen in winter; receives waters of Volga, Ural, Emba, Kur, Terek, Atrek, Gûrgen, Sefid-Rud, Aras, and other rivers; is believed to have been formerly connected with Sea of Aral; valuable fisheries—sturgeon, salmon, perch, carp, etc.; important export of caviare and isinglass; canals connecting upper waters of Volga with Lake Ladoga and the Dûna give through communication to Baltic Sea; schemes for connecting Caspian with Sea of Azov and Black Sea not yet materialized; seal hunting is carried on in N.; transport trade in petroleum. Chief port, Astrakhan. For war operations see **RUSSIA**.

CASS, LEWIS (1782-1866), American statesman, diplomatist and soldier, was born at Exeter, N.H. He later removed to Marietta, Ohio, where he studied law, practicing at Zanesville. In 1806 he was elected to the Ohio Legislature. He fought in the second war against England and soon after was appointed governor of

Michigan Territory, a post in which he succeeded in winning not only the respect but even the affection of the Indians. He was largely instrumental in fitting out the expedition for the exploration of the northern shore of Lake Superior and the course of the upper Mississippi. At the time of his resignation as Governor of Michigan, he had concluded 22 treaties with the Indians, by which cessions of territory had been acquired in Ohio, Indiana, Michigan, Illinois and Wisconsin to an amount almost equaling one quarter of the entire territory of those states. On the reconstruction of President Jackson's cabinet in 1831, Cass was appointed Secretary of War. In 1836 he was appointed Minister to France, holding this post for six years. He was much liked by King Louis-Philippe and wrote a pleasing account of this monarch in his *King, Court and Government of France*. From 1845-48 he was a U.S. senator and in 1848 was Democratic candidate for the Presidency, but was not successful.

CASSAGNAC, ADOLPHE GRANIER DE (1806-80), Fr. journalist; first an Orleanist, he later became a supporter of the Empire, and his vehement style frequently involved him in duels and lawsuits.

CASSANDRA (classical myth), dau. of Priam and Hecuba; loved by Apollo, who promised her any gift if she would yield to his desires. She asked for the gift of prophecy, but having received it, she refused to fulfil her promise, and Apollo, by way of revenge, ordained that all her predictions should be disbelieved. She became the spoil of Agamemnon after the sack of Troy.

CASSANO (45° 21' N., 9° 31' E.), town, Milano, Italy; here French defeated Austrians, 1705; Austrian and Russians defeated French, 1799. Pop. 9,000.

CASSATION, COURT OF, Fr. court of appeal; formed by the *Chambre des requetes*, *Chambre Civile*, and *Chambre criminelle*, which unite to form the supreme court of appeal, the *Conseil superieur de la magistrature*.

CASSATT, ALEXANDER JOHNSTON (1839-1906), an American railway official, born in Pittsburgh. He was educated at the University of Heidelberg and in scientific schools in the United States. In 1861 he began his service with the Pennsylvania Railroad as a surveyor, and worked his way through the various branches of the service until he was made President of the system in June, 1899. It was largely through his enterprise that the Penn-

sylvania Terminal in New York City and the tunnels under the Hudson and East rivers were planned and built. He had many large financial interests and was a director and officer in several large corporations.

CASSATT, MARY (1855), artist, was born in Pittsburgh, Pa. In 1875 she went to Europe to study art and lived for some years in Spain, later settling in Paris. Here, in 1880, she exhibited at the Impressionist Exposition. Some years later she exhibited in New York City, but returning to France, she established an art studio in Paris, where she still resides. She has done some remarkable etchings, her work in this field ranking with that of the foremost artists in this class of work. Her specialties as subjects are women and children and particularly mother and child. Miss Cassatt's *The Young Mother* is in the Luxembourg in Paris and in the Metropolitan Museum in New York she is represented by *Mother and Child*.

CASSEL, KASSEL (51° 19' N., 9° 31' E.), city, Hesse-Nassau, Germany, on Fulda; has old palace of electoral princes, and museum built 1769, which has fine library; newer part of town regularly laid out, with wide streets; important industrial center, manufactures machinery, mathematical instruments; textiles, iron ware, etc. Pop. 163,000.

CASELL, SIR ERNEST JOSEPH (1862-1921), financier; born at Cologne; financed the great Assuan dam in Egypt, the Swed. railways, the Central London Tube Ry.; assisted in negotiating three state loans for Mexico, and raised a loan for China after the war with Japan; has contributed generously to various charities, giving \$250,000 to the Brit. Red Cross Soc. as well as to other funds during the World War.

CASSIA, VIA (42° 40' N., 12° E.), ancient high-road, Italy, between Florence and Rome.

CASSIANUS, JOANNES EREMITA (360-448), religious recluse; one of earliest founders of conventual establishments; spent several years amongst the ascetics in the Egyptian deserts; was ordained deacon by St. Chrysostom at Constantinople, 403; founded at Marseilles the abbey of St. Victor and a convent for nuns; wrote *Collationes Patrum Sceticorum*.

CASSINI, Ital. family of astronomers, chief of whom were: (1) Giovanni Domenico (1625-1712), prof. of Astron., Bologna 1650, astronomer-royal, France 1671-1711; (2) Jacques C. (1677-1756),

s. of above, and successor to his appointments; F.R.S. 1696.

CASSIODORUS, FLAVIUS MAGNUS AURELIUS (c. 490-585 A.D.), Syrian author; founded two monasteries at Squillace for the advancement of learning; wrote on history, politics, theology, and grammar. His *Variae* is a chief source of knowledge regarding the Ostrogothic rule in Italy.

CASSIOPEIA (classical myth.), wife of Cepheus, king of Ethiopia, and mother of Andromeda; in astronomy, a northern constellation, the chief stars of which outline the letter W. C. is in the Milky Way, and in it the famous temporary star, *Tycho's Star*, was discovered in August 1572.

CASSIQUE (*Cassicus*), perching birds which take the place of the Old World starlings in America. They are characterized by a shield at the base of the bill.

CASSIQUIARI, See ORINOCO.

CASSITERIDES ('Tin Islands'), name given by Phoenicians, Greeks, and Romans to group of islands generally identified as the Scilly Isles.

CASSITERITE (SnO₂), tinstone or stannic oxide, commonest tin ore, containing 79% metal; found in Cornwall, Borneo, Mexico, Australia; used for extraction of metal; also for preparation of mordants employed in calico-printing.

CASSIUS, GAIUS (d. 42 B.C.), Rom. praetor; member of plebeian family, which had once held patrician rank; one of the murderers of Julius Caesar; in the war which followed he was routed at *Philippi*, and, giving up all hope, he commanded his freedman to slay him.

CASSIUS, SPURIUS, VISCCELLINUS, Rom. consul disliked by nobles as demagogue; introduced first *Lex agraria* 486 B.C.

CASSIVELLAUNUS, Brit. king, who offered a valiant defense to Julius Caesar during his second invasion, 54 B.C., but was compelled to capitulate, and promised tribute to the conqueror.

CASSOCK (Fr. *casaque*), originally a long, loose robe worn by soldiers and horsemen; nowadays a black variety is used by priests.

CASSOWARY (*Casuarus*), genus of ostrich-like birds; one species (*C. australis*) is found in N. Australia, where it inhabits scrub; very retiring and wary, and dangerous when wounded; a similar species found in Ceram, Dutch E. Indies.

CASTAGNO, ANDREA DEL (1390-1457), Ital. painter, the secret of whose coloring is lost and has given rise to many legends.

CASTAIGNE, ANDRE (1861), French artist and illustrator, was born at Angouleme, France, studying art at the Suisse Academy, Paris and later at the Beaux-Arts, where he was a pupil of Gerome. In 1890 he went to Baltimore as director and instructor of the Charcoal Club, an art school. In 1891 he began doing illustrations for the Century Magazine. Three years later, he returned to France and taught art at the Colorossi Academy, Paris. He has done work in oils, water-colors, charcoal and pen and ink. In 1904 he published *Fata Morgana*, a novel, dealing with Parisian art life and illustrated by himself.

CASTALIA, famous spring which rises on Mount Parnassus, near Delphi; sacred to Apollo and the Muses.

CASTANETS, percussion musical instruments, consisting of small hollow shells of hardwood or other substance, bound together with loop fitting on thumb and forefinger; much used in dances from times of the Early Greeks and Romans, and introduced into Europe by the Moors.

CASTANOS, FRANÇOIS XAVIER DE (1756-1852), Span. general who forced French to make humiliating capitulation of Baylen, 1808.

CASTE (Lat. *castus*, pure), term now usually associated with classes of Hindu society. A development of Brahmanism, c. had originally four chief divisions—the Brahmins, a sacerdotal class; Kshatriyas, military; Vaisyas, agricultural; and the Sudras, who were servants of the three preceding classes. Out of these have grown many other sub-classes. C. in modern India has proved a serious obstacle to civil progress and religious reform by the restrictions and limitations it imposes upon marriage, trade, or profession, and the amenities of social intercourse. Time, however, is gradually breaking down these restrictions.

CASTELAR Y RIPOLL, EMILIO (1832-99), Span. statesman; prof. of History and Philosophy in univ. of Madrid, 1856; removed from his professorship for his attacks on the government, 1865; took part in the rising of 1866, was condemned to death, but made his escape to France, returning to Spain in 1868, on the success of the Revolution. In 1873 C. was app. dictator by the Cortes, but a year later he was compelled to resign. He returned in 1876, and again took part in political life, but finally retired in 1893.

CASTELBUONO (37° 53' N., 14° 6' E.), town, Palermo, Sicily; site of former monastery. Pop. 11,000.

CASTELFIDARDO (43° 29' N., 13° 31' E.), town, Ancona, Italy. Pop. 9,000.

CASTELFRANCO DELL' EMILIA (44° 36' N., 11° 3' E.), town, Emilia, Italy; silk trade. Pop. 14,000.

CASTELFRANCO VENETO (45° 40' N., 11° 57' E.), fortified town, Venetia, Italy; birthplace of Giorgione; scene of Austrian defeat by French, 1805. Pop. 3,700.

CASTELL, EDMUND (1606-85), Eng. Oriental scholar; ed. Cambridge; spent eighteen years in compiling his *Lexicon of the Seven Tongues*; became Prebendary of Canterbury and prof. of Arabic at Cambridge.

CASTELLAMARE DEL GOLFO (38° 5' N., 12° 55' E.), town, Trapani, Sicily; olive oil, anchovies, wine. Pop. 21,000.

CASTELLAMMARE DI STABIA (40° 40' N., 14° 25' E.), fortified seaport, Campania, Italy, on Bay of Naples; ancient *Stabiae*; bp.'s see; mineral springs; popular resort. Pop. 36,500.

CASTELLANA (40° 52' N., 17° 12' E.), town, Bari, Italy. Pop. 11,500.

CASTELLANETA (40° 38' N., 16° 57' E.), town, Lecce, Italy; seat of bishopric. Pop. 11,000.

CASTELLIO, SEBASTIANUS (1515-63), Swiss Biblical critic; trans. Bible into Lat. and Fr.

CASTELLO, BRANCO, CAMILLO (1825-90), Portug. novelist; produced upwards of 200 vol's in several departments of lit., but chiefly remarkable for his novels.

CASTELLO, GIOVANNI BATTISTA (d. c. 1569), Ital. artist, architect, and sculptor; painted *Martyrdom of St. Sebastian*, *Christ as Judge of the World*, etc.; at invitation of Philip II. went to Madrid (where he died), and was app. architect of the king's palaces.

CASTELLON DE LA PLANA (40° 7' N., 0° 20' W.), province, E. Spain; occupies strip of Mediterranean coast; surface mountainous; principal exports, fruit and fish; area, 2,495 sq. miles. Pop. 315,000.

CASTELLON DE LA PLANA (37° 59' N., 0° 5' W.), town and port, capital of C. province; manufactures brandy, sailcloth, and linen; is center for exports of oranges, wine, etc. Pop. 32,000.

CASTELNAU, EDOUARD DE CURIERES DE (1851), French military commander; born Saint Afrique. He had been but a year at the military school of St. Cyr when the Franco-Prussian war began, and he immediately took active service, rising to the rank of captain. Following the conclusion of the struggle, he resumed his military studies, rose through various grades of the service until, when the World War broke out, he was chief of staff to General Joffre. Later was made Marshal of France. He was charged with the defense of Nancy in Sept. 1914 against the desperate attempts of Crown Prince Rupprecht's army to capture it and make it the gateway to Paris. The Bavarians were beaten back and Castelnau was hailed as the 'Savior of Nancy.' He commanded the French offensive in the Champagne fighting, and when the armistice was signed was preparing an attack on Metz in conjunction with Gen. Pershing. Three of his sons were killed in the war.

CASTELNAU, MICHEL DE (1520-92), Fr. diplomatist and soldier; accompanied Mary Stewart to Scotland, and used every endeavor to effect a reconciliation between the Scots queen and Elizabeth; performed brilliant military services in France; was ten years ambassador to court of Queen Elizabeth, and sought to bring about a marriage with the Duke of Alençon.

CASTELTERMINI (37° 15' N., 13° 30' E.), town, Girgenti, Sicily; sulphur and salt mines. Pop. 13,000.

CASTELVETRANO (37° 41' N., 12° 46' E.), town, Trapani, Sicily; wine, oil, silk. Pop. 25,000.

CASTIGLIONE, BALDASSARE (1478-1529), Ital. diplomatist and author; known as 'the perfect courtier'; was attached to the court of Guidobaldo Malatesta, Duke of Urbino, by whom he was sent on a mission to Henry VII. of England. He wrote Latin and Ital. poems of rare quality, and a prose treatise, *Il Cortegiano*, 1528. His portrait, by Raphael, is in the Louvre.

CASTIGLIONE, GIOVANNI BENDETTO (1616-70), Ital. artist; painted portraits, hist. scenes, and landscapes; many of his works are to be found in Rome, Genoa, Venice, Florence, and Naples; the Louvre contains eight examples.

CASTILE, CASTILLE (42° N., 4° W.), old kingdom, Spain, consisting of plateau region, and divided into provinces of Old and New C.; watered by Douro, Tagus, Guadiana; surrounded by mountain ranges; became kingdom, XI. cent.,

later united with Leon; united with Aragon in 1479.

CASTILHO, ANTONIO FELICIANO DE (1800-75), Portug. poet, etc.; blind from his sixth year; pub. *Primavera*, 1822; *Amor e Melancholia*, 1823; *A noite de Castello*, 1836; *Cuimes do bardo*, 1838 — volumes of bucolic and romantic poetry.

CASTILLO SOLORZANO, ALONSO DE (1584-1647), Span. novelist, poet, and dramatist; distinguished for versatility and graceful style; pub. several picturesque novels, vol's of humorous verse, and dramas.

CASTING is both a process and its product. (1) Casting is the process of pouring melted metal or other fusible substances into moulds, where it cools and hardens to shape of mould: is also applied to pouring into moulds any substance rendered liquid in any other way, such as mixing with water or dissolving (cement, gelatine, etc.). Details of casting process vary with melting temperature of substance, its affinities for other substances when melted, and the nature of available mould materials. In case of iron and brass, preparation of molds is the most important part of art of founding. Sand moulds with a small percentage of loam or clay are used for iron and brass, made slightly damp, so as to resist the pressure of the molten metal and to hold impress of the pattern. Most metals, except iron and steel, are cast in iron moulds when required in ingot form. When casting has been successfully accomplished, the hot piece must be cooled slowly and uniformly, as uneven distribution of contraction in cooling will warp the pieces out of shape or give rise to dangerous stresses. Sometimes casting is employed as a means of joining two different pieces of metal. (2) Casting also denotes the piece cast. Ordinarily it means a piece of iron, (cast iron), the shape of which is produced by moulding and pouring. These have a rough surface, with a hard skin due to partial fusion with sand of mould. They are not precisely true to form, are brittle, not flexible, and weak against tensile stresses. They are also apt to be nonhomogenous, and may have unknown shrinkage strains in their interior. On account of their relative low strength, a casting must have three or four times the cross-section of an equivalent forged or rolled steel piece. As, however, most machinery requires to be relatively massive in order to absorb vibrations and give rigidity, it usually happens that the dimensions necessitated by this requirement are ample for strength.

CAST IRON. See IRON AND STEEL.

CASTLE (Lat. *castellum*, fortress), word introduced into England by the Normans to describe a stone defensive building, which took the place of the Saxon *burgh*, a timber palisade encircling the top of a mound, which was the only kind of a fortification then known in Britain. William I. introduced the square stone keep of which the 'White Tower' in the Tower of London is a notable example. Upwards of 100 ft. square, with walls of rubble and mortar, 15 ft. in thickness, such a structure was practically impregnable against the battering weapons of that day. A more common type of the Norman c., however, was the 'shell-keep,' an encircling stone wall, in place of the wooden palisade. Living apartments and offices were afterwards built against the inner sides of these walls, while from the large central space sprang the keep or *donjon*, square or round; this being very strongly built, and usually containing the well, served as the last defense of the garrison if the outer defenses were carried.

CASTLE, EGERTON (1858-1920), Eng. author; was for some years on staff of *Saturday Review*, 1855-94; pub. *Schools and Masters of Fence*, 1884; and *English Book Plates Ancient and Modern*, 1891. With Agnes Castle, his wife, wrote other novels: *Consequences*, *Young April*, *Incomparable Bellairs*, *The Secret Orchard*, etc.; has also produced plays: (e.g.) *Saviolo*, *The Pride of Jennico*, etc.

CASTLE, VERNON (1887-1918), English actor, dancer and aviator, was b. at Norwich, England, this being the stage name of Vernon Castle Blythe. He was educated as a civil engineer at Birmingham University. He made his first appearance on the stage in 1907 at the Herald Square Theatre, New York, later playing minor parts in various productions. Having developed a talent for dancing, he opened a dancing school, which proved extremely successful, and after his marriage to Irene Foote (Mrs. Vernon Castle) in 1911, he devoted himself entirely to exhibition dancing and to teaching. Soon after the outbreak of the war, he took up flying and received his pilot's certificate in 1916, a month later becoming attached to the British Royal Flying Corps. He served in France for a year, but was killed at Fort Worth, Texas, while serving as instructor with the Canadian contingent of the Flying Corps which had been transferred there for winter training.

CASTLE DOWNING (52° 52' N., 1° 22' W.), town, Leicestershire, England; manufactures hostery and silk; breweries.

CASTLE RISING (52° 48' N., 0° 28' E.), village, Norfolk, England; remains of famous Norman castle of XII. cent.

CASTLEBAR (53° 52' N., 9° 17' W.), town, capital of County Mayo, Ireland; market for agricultural produce; scene of massacre of Eng. garrison by Irish, 1641. Pop. 4,000.

CASTLEFORD (53° 44' N., 1° 21' W.), town, on Aire, West Riding, Yorkshire, England; glassworks. Pop. 25,000.

CASTLE-GUARD, in feudal times the great barons were required to provide knights to guard royal castles, but eventually a money payment was imposed upon them, known as 'castle-guard rent.'

CASTLEMAINE (37° 4'S., 144° 14'E.), town, Victoria, Australia; gold mines were among first discovered in Australia; Pop. 6,000.

CASTOR AND POLLUX (classical myth.), also called 'The Dioscuri,' twin sons of Zeus and Leda; presided over games; patrons of hospitality; protectors of sailors, who sacrificed to them when they came to the masthead as a fire (St. Elmo's fire). C. and P. names of two bright stars in constellation Gemini; C. is a double star, but P. is brighter.

CASTOR OIL, oil obtained from the seeds of a plant, *Ricinus communis*, belonging to the order Euphorbiaceae, grown in most tropical and sub-tropical countries. The seeds are very poisonous, and the oil is obtained from them by crushing or by decoction, and purified. It is viscid, colorless, with slight characteristic smell and taste, and is used medicinally as a purgative.

CASTRATION, the removal of the testicles; when performed on a child prevents the growth of hair on the face and increase in size of larynx; has been practiced on professional singers to produce a high-pitched voice, and is common in East.

CASTREN, MATTHIAS ALEXANDER (1813-53), Finnish philologist; undertook adventurous journeys through Lapland and Siberia; pub. several valuable works on philology.

CASTRES (43° 36' N., 2° 14' E.), town, on Agout, Tarn, France; interesting buildings; fine promenades; XVI.-cent. Huguenot stronghold; woollen fabrics. Pop. 20,000.

CASTRIES (13° 45' N., 61° W.), port, capital, St. Lucia, W. Indies; exports sugar. Pop. 7,000.

CASTRO, CIPRIANO (1863), president of republic of Venezuela, 1899-1908; was instrumental in deposing Andrade, 1899; his financial measures led to dispatch of punitive expedition by Great Britain and Germany, 1903, and afterwards embroiled him with Americans, French, and Dutch; was deposed, 1918, and succeeded by General Juan Gomez.

CASTRO, KASTRO.—(1) (39° N., 26° 45' E.) capital of Mitylene (Lesbos), Aegean Sea. Pop. 20,000. (2) (39° 53' N., 25° 2' E.) town, Lemnos, Aegean Sea.

CASTRO URDILALES (42° 35' N., 3°

CASUISTRY, ecclesiastical case law or moral science; sprang up in the R.C. Church with the system of confession, made obligatory by Lateran Council, 1215. C. has taken sinister meaning from ingenuity displayed in arguing away ambiguous acts.

CASUS BELLI, term in international law for offense which makes war justifiable.

CAT, name for a family of carnivora, (*Felidae*), comprising lion, tiger, leopard, puma, wild cat, etc., but usually restricted to the latter species, (*Felis catus*), the domestic cat, (*F. domestica*) and other small forms, such as the Nubian gloved cat, (*F. maniculata*). The domestic cat, of which the tabby, usually grey, with light stripes, tortoise-shell, Angora, Manx, Maltese, Persian, with green eyes and silverish fur, Blue Persian, slate grey with amber eyes, and Spanish are among the better-known varieties, has been a companion of man since the dawn of society, and figured largely in the folk-lore of Aryan and other nations, and was associated with magic and religion. Although the domestic c. when running wild assumes the habits and coloring of the wild c., evidence tends to show that the former is a distinct species.

CAT-BIRD, name applied to two distinct Passerine birds—to the Amer. *aleoscoptes carolinensis*, one of the Amer. mocking-birds, a member of the thrush family, and to Australian *Aeluroides viridis*, one of the birds of paradise.

CATERPILLAR. See LEPIDOPTERA.

CAT FAMILY (*Felidae*), a family of carnivores, sub-order *Fissipedia*, with about 85 species scattered all over the world, except in Australia, New Zealand, and Madagascar. They are characterized by their completely retractile claws, their short faces, and the reduced number of their cheek teeth, which typically number four in the upper and three in the lower jaw. Among the cats the best known is the lion, *Felis leo*, characterized

by its uniform tawny color, and by the shaggy mane that ornaments the head and neck of the male. The lion sleeps by day in thickets or in dense reeds, and prowls at night in search of the large animals—antelopes, giraffes, camels, buffaloes, and such-like—that form its prey. Although now confined to Africa, Persia, and N.W. India, lions were formerly found, in historic times, throughout S. Asia and S.E. Europe, and fossil remains, Pleistocene, have been found even in Britain.

Closely related to the lion, but differing in its striped coat and lack of mane, is the tiger (*F. tigris*), which is found only in Asia, but there from the snows of Manchuria to the south of India. The individuals inhabiting the colder regions have long, thick coats, very different from those of their tropical brethren.

The leopard, *F. pardus*, also known as pard and panther, is less numerous than the preceding species, and is spotted with dark brown and black, the spots often arranged in circles. It occurs throughout Africa and the greater part of Asia, and its bones have been found in Brit. caves.

The snow leopard or ounce, *F. unica*, with longer and paler fur than the last, inhabits the lofty plateaus and mountains of Central Asia, 9,000 to 18,000 ft. above sea level.

Less important and less imposing Old World cats are the smaller tiger cats of tropical Asia and Africa; the S. African serval, *F. serval*, short tailed, large eared, black spotted; the clouded leopard, hunting leopard, or cheetah, and common wild cat; the caracal or Persian lynx, *Lynx caracal*, with bright yellow-brown unspotted fur and black-tipped tail, found in W. Asia and Africa; and the true lynxes, *Lynx*, with long limbs, short tail, and ears with a tuft of hairs at the tip, some of which occur both in Europe and in Asia.

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CAT ISLAND.—(1) (30° 11' N., 89° 1' W.) island, Mississippi. (2) (24° 30' N., 75° 30' W.) island, one of the Bahamas, W. Indies. Once wrongly supposed to be first landing place of Columbus in America.

CATACHESIS, term of rhetoric for misplacement of words, (e.g.) mixed metaphor and 'Malapropism'.

CATACOMBS, Rom. subterranean burial places, consisting of galleries with recesses for tombs, closed after burial with an inscribed stone; the most famous is that under the Appian Way, used also as a place of refuge by the early Christians. The c's of Paris were originally stone quarries, but in 1787 the authorities began to transfer to this receptacle the bones from the cemeteries.

CATAFALQUE (Ital. *catafalco*, scaffold), temporary structure used in funerals either as a canopy when a body is laid in state, or a similar covering for a funeral car.

CATALEXIS, term in prosody for omission of syllable required for full feet of verse.

CATALINI, ANGELICA (1740-1849), Ital. prima donna; first appearance in London, 1806, where she reigned as public favorite for about seven years; met with success in all the European capitals; noted for her charity and kindness; founded free singing school at Florence.

CATALONIA (c. 41° 35' N., 2° E.), former principality and province, N.E. Spain, now comprising Barcelona, Tarragona, Lerida, and Gerona; surface mountainous and wooded; watered by numerous streams; these, together with a good system of artificial irrigation, render C. chief manufacturing and agricultural region of Spain; called the 'Lancashire of Spain'; produces cereals; cotton, silk, and woolen goods manufactured; conquered by Philip V., 1714; held by France, 1808-13. See **SPAIN**.

CATALYSIS.—In chem. a substance which initiates or accelerates chemical interaction between other substances, without itself undergoing change, is termed a *catalytic agent*, or said to act by catalysis; thus manganese dioxide, in preparation of oxygen from potassium chlorate, causes oxygen to be liberated more rapidly and at much lower temperature.

CATAMARAN (word of Tamil origin; *catta*, to tie, *maram*, wood), name of a surf boat, propelled by sails or oars, consisting of two or more logs of wood lashed together, much used in E. and W. Indies and S. America; also used erroneously to describe a scolding woman.

CATAMARCA (c. 28° S., 67° W.), province, Argentine Republic; surface mountainous, with fertile valleys; rich in minerals, gold, silver; area 47,531 sq. miles. Pop. estimated 100,800.

CATAMARCA (27° 59' S., 67° 7' W.), town, capital of C. province, Argentine Republic; exports flour and wine. Pop. 7,400.

CATAMOUNT, CATAMOUNTAIN, properly 'cat of the mountain,' applied to the Common Wild Cat, the Puma, and the Lynx.

CATANIA (37° 28' N., 15° 5' E.), town, E. coast of Sicily; has cathedral dating from Norman times; rebuilt in 1693 after earthquake; observatory, univ., remains of Rom. amphitheatre, aqueducts, theatres, baths; former Benedictine monastery has library and museum of antiquities; manufactures textiles; has frequently suffered earthquakes and eruptions of Etna. Pop. 217,000. Province, area, 1917 sq. miles. Pop. 820,000.

CATANZARO (38° 55' N., 16° 37' E.), city, Calabria, Italy; has cathedral and ruined castle; manufactures silk, velvet, and woolen goods. Pop. 38,000; province, 506,000.

CATAPULT (Lat. *catapulta*), military weapon, somewhat like a huge cross-bow, but mounted on a stand, used by Greeks and Romans to discharge arrows, stones, etc.; forked stick, provided with elastic, used by boys for throwing stones.

CATARACT, see **EYE**.

CATARGIN, LASCAR (1823-99), Rumanian statesman; was twice pres. of the Council, and promoted many useful administrative reforms.

CATARREH, inflammation of a mucous membrane, accompanied by swelling, congestion, and an increase of the secretion. The term is commonly applied to such inflammation in the respiratory and nasal passages, or 'common cold.' This is treated by taking a purgative, (e.g.) calomel, then hot bath and bed. Dover's powder is sometimes recommended. A tonic and change of air complete the cure.

CATASTASIS (Greek), division of the classical drama which consists of pro-tasis, epistasis, c., and catastrophe; in

rhetoric, part of a speech giving outline of matter in hand.

CATAUXI, cannibal Indian tribe of W. Brazil.

CATAWBAS, nearly extinct tribe of Indians, dwelling in neighborhood of Catawba river, S. Carolina; 'Catawba Wine,' made from grapes from near river, has been praised by Longfellow.

CATECHISM, a book of instruction, in the form of questions and answers; not necessarily of a religious character, but generally used in that application. Amongst Church catechisms may be mentioned that of Luther, 1529, the Anglican, contained in the Book of Common Prayer, and the Heidelberg, used by the Dutch Church; Longer and Shorter Catechisms by Peter Canisius, S. J., 'The Penny Catechism', England, used by Roman Catholics; and the famous Presbyterian Shorter Catechism.

CATECHU, CUTCH, extract from acacia plants, is of two kinds: (1) pale cutch, from *Uncaria gambier*; and (2) black cutch, from *Acacia catechu*. Both are bitter and stringent, and used in tanning and dyeing.

CATECHUMENS, name given in the early Christian Church to converted Jews and heathen who were undergoing instruction preparatory to receiving the rite of baptism.

CATEGORY (Gk. *katagoria*, accusation, assertion), Aristotle's ten categories are an attempt to classify the possible assertions (*predicates*) about anything (*subject*). Such assertions may tell us what the subject is (*Substance*), what it is like (*Quality*), how much or how many (*Quantity*), how it is related to something else (*Relation*), where (*Place*) or when (*Time*) it is, its *Condition* (a more permanent) or *State* (a more transient), whether and how it is acting (*Action*), and whether anything and what is being done to it (*Passivity*). See **ARISTOTLE**.

CATEL, CHARLES SIMON (1773-1830), Fr. composer; helped to found the Conservatoire, 1795.

CATELU, LE, LE CATEAU CAMBRESIS (50° 4' N., 3° 22' E.), town, Nord, France; textiles, beer, sugar. Treaty concluded here between England, France, and Spain, 1559. Pop. 11,000.

CATERAN, old collective term for Highland cattle-raiders.

CATERHAM (51° 17' N., 0° 6' W.), town, Surrey, England; large barracks in vicinity. Pop. 11,000.

CATERPILLAR TRACTORS are trac-

tors so designed that they have maximum tractive force for their weight, and are able to operate in soft ground, loose sand and morass. They can also pass over obstacles of considerable size which may be in their path.

They are distinct in principle and design from both the 'Flatwheel' and the 'Chain-tread' types of tractor, in that the wheels which do the driving carry little or no weight, while the wheels which carry the weight, not only do no driving at all, but run on the smooth inner faces of rail-tracks of the crawlers or chains, and are not affected by the pull of the chain.

The tractor is supported and driven forward by two chains composed of steel links or pads, hinged together. Their inner surface is smooth and forms the rail-tracks on which the machine moves, while the rough outer surface, may have inserts of wood, to prevent slipping on stone, etc.

The mechanism on each side consists of two axles, one in the front and one in the rear of the machine. Between them, and fastened to them is a frame which carries a number of small idle wheels with smooth faces, so formed as to fit the tracks on the inside of the crawlers. It is on these wheels, rolling on the rail-tracks of the crawlers that the tractor moves along. On the axles are mounted two similar sprocket wheels, one power driven from the engine through gears and a differential gear, the other an idler. The crawler chain passes around these sprocket wheels, meshes with them, and is driven by them. The application of a brake to the drive shaft of one or the other of the crawlers, thereby slowing down one and speeding up the other, enables the operator to steer the machine.

CATESBY, ROBERT (1573-1605), Eng. conspirator; descended from C., instrument of Richard III.; of good family and abilities; suffered much as R.C. recusant under Queen Elizabeth, and, when James I. would not restore Roman Catholicism, organized the Gunpowder Plot; fled and was shot.

CAT-FISHES, SILUROIDS, large group of over 1,000 fishes, so named on account of number of feelers round the mouth; found almost wholly in the fresh waters of temperate and tropical regions. One of the most interesting is the malleated S. Amer. *Callichthys*, which in the dry season moves overland in search of water, or burrows in the mud. Both sexes are said to guard the nest and eggs until the young are hatched.

CATGUT, tough material used for strings of violins, guitars, etc., and made

principally from sheep's intestines which, after being thoroughly cleansed, scraped and exposed to antiseptic fumes, are twisted into cords.

CATHARI, CATHARS, CATHARISTS (Gk. *katharos*, pure), religious sect, persecuted as heretics, spread over E. and W. Europe during the Middle Ages. In the E. they were called Bogomili and Paulicians, in the W., Albanenses Bulgari, and, in S. France, Albigenses. The C. all held a more or less modified Manichæism. Holding the essential sinfulness of the flesh and the material world, they denounced marriage and property, kept long fasts, and of animal food ate only that which was supposed not to have been produced sexually, (i.e.) fish.

CATHAY, name by which China was known in mediæval times.

CATHCART (55° 50' N., 4° 16' W.), town, Renfrewshire, Scotland; has sandstone quarries; near site of battle of Langside, 1568. Pop. 15,000.

CATHCART, SIR GEORGE (1794-1854), Eng. soldier; s. of Earl Cathcart; Wellington's aide-de-camp at Quatre Bras and Waterloo; served in Crimea and was killed at Inkerman; buried where he fell, a spot which was called in his honor, 'Cathcart's Hill.'

CATHCART, WILLIAM SCHAW, 1ST EARL CATHCART (1755-1843), Brit. general; commander-in-chief in Ireland, 1803; commanded land forces at Copenhagen, 1807, for which services received title of viscount; ambassador to Russia, 1813-14; accompanied Tsar Alexander during campaigns, 1813-14; cr. Earl, 1814.

CATHEDRAL (Gk. *cathedra*, chair), church containing a bp.'s throne. The c. is under the control of the dean (*q.v.*) and a chapter of canons or prebendaries; by them, after the issue of a *congéd'élire* from the Crown, the bp. is chosen. The bp. is visitor of the c., of which there are forty in England and Wales. In mediæval documents the c. is translated *ecclesia episcopalis*; the generic name for a church, *domus dei*, contracted to *dom*, (still Ger. name for c.), became for a time special name for a c.

CATHEDRAL PEAK, a mountain peak of the Sierra Nevada Range, in Mariposa co., Calif. It contains the source of the Merced river, and is about 11,000 feet high.

CATHER, WILLA SIBERT (1876). Graduated from the University of Nebraska in 1895, Litt.D., 1917. Was on the staff of the Pittsburgh Daily Leader from 1897 to 1901 and was associate

editor of McClure's Magazine from 1906-12. In addition to writing for various magazines she was the author of: *April Twilight*, 1903; *The Troll Garden*, 1905; *Alexander's Bridge*, and *The Bohemian Girl*, in 1912; *O Pioneers*, 1913; *The Song of the Lark*, 1915; *My Antonio*, 1918, and *Youth and the Bright Medusa*, 1920; *One of Ours*, 1922.

CATHERINE, the name of six saints in the R.C. hagiology, the most famous being (1) St. Catherine of Alexandria, who upbraided the Emperor Maximus for his cruelties and worship of false gods, for which she was scourged and cast into prison. The legend runs that she converted the empress and all who approached her; was eventually beheaded, and buried on Mount Sinal, upon which site Justinian I. built a monastery to commemorate her martyrdom. She frequently appears in art, accompanied by the wheel, (St. C.'s wheel) on which she was broken, and receiving the ring of espousal from the Child Jesus. Her memory is preserved in England in the C. wheels, fireworks, of Nov. 5. In France she is the patron of young girls; her feast-day is Nov. 25, and at the age of 25 the jeune fille 'coffs' St. C.; an old maid being said to have 'coffed St. C.' (2) St. Catherine of Siena (1347-80), youngest of 25 children of a dyer named Giacomo di Benincasa; dedicated herself to the religious life from her seventh year; she took a prominent part in the religious polemics of her day, and it was entirely through her exertions that Gregory XI. was induced to return to Rome from Avignon; she nursed the plague-stricken, and was venerated for her gentleness. She has been described by a noted writer as 'one of the most wonderful women that have ever lived.'

CATHERINE I. (1683-1727), empress of Russia; *dau.* of a peasant; *m.* a Swedish dragoon; subsequently became mistress of Prince Menshikov, at whose house she was seen by Peter the Great, who made her his mistress, and later, his wife. She changed her name from Martha to Catherine on being received into the Greek Church; was crowned with solemn state, and declared Peter's successor. Like Peter, she was a barbarian of genius, gave him valuable aid in his reforms, and enjoyed wide popularity with the Russian people. After his death, 1725, she lived a life of great excess, but with Menshikov's aid maintained the prosperity of the country.

CATHERINE II. (1729-96) empress of Russia; *b.* Stettin, of which her *f.*, the Prince of Anhalt-Zerbst, was gov.; *m.* Arch-Duke Peter of Russia, 1745, an ignorant sensualist, who frequently ill-

treated her. Thus mated and living in the vile court of the Empress Elizabeth, C.'s immoralities soon became as flagrant as those of her husband. The latter succ. Elizabeth as Peter III. (*q.v.*) in 1761, and one of his first actions was to declare their *s.*, Paul, illegitimate. Peter was murdered 1762, and C., who was supposed to have had a hand in the business, was declared empress. Notwithstanding her entire lack of morality, C. was a woman of great ability, and governed her country very successfully.

CATHERINE HOWARD. See HENRY VIII.

CATHERINE DE' MEDICI (1519-89), queen of France; *dau.* of Lorenzo de' M.; wife of Henry II., and mother of Francis II., Charles IX., and Henry III. C. exercised no influence during the reign of her husband, who was dominated by his mistress, Diane of Poitiers, but during the reign of her three sons she was all-powerful. The inveterate foe of the Protestants, she was directly responsible for the murder of Admiral Coligny and the wholesale Massacre of St. Bartholomew. C. introduced the ballet into France and loved sumptuousness and magnificence; at the same time she was fearless, treacherous, and relentless in her character, loved by none and feared by all.

CATHERINE OF ARAGON (1485-1536), queen-consort of Henry VIII.; his first wife; *dau.* of Ferdinand and Isabella of Castile and Aragon; *m.* when 16, Arthur, Prince of Wales, who died 2nd April, 1502; subsequently *m.* his bro., Henry VIII., 1509, to whom she bore six children, Queen Mary I (*q.v.*) being the only one who survived. Henry having obtained a divorce, 1533, C. passed into retirement, and *d.* at Kimbolton Castle, Huntingdonshire. Outside the four years 1529-33, C. is anything but a prominent figure in history; she seems to have been popular in the country, but to have done nothing for the chroniclers to record.

CATHERINE OF BRAGANZA (1638-1705), queen-consort of Charles II. of England; *dau.* of John IV. of Portugal, who settled Bombay upon her at her marriage. She bore no children, and there were suggestions of divorce, but the country was pleased with the Portuguese alliance as a pledge of enmity to Spain. She remained loyal and devoted to the gay monarch and felt much grief at his death.

CATHERINE OF VALOIS (1401-37), queen-consort of Henry V. of England; *dau.* of Charles VI. of France; she *m.* Henry, 1420, and bore a *s.*, Henry VI. in

the following year. After Henry's death, 1422, she *m.* Owen Tudor, a Welsh gentleman, by whom she had three sons, one of whom, Edmund, Earl of Richmond, was the *f.* of Henry VII.

CATHERINE FARR. See HENRY VIII.

CATHERWOOD, MARY HARTWELL (1847-1902), American novelist, was *b.* at Luray, Ohio, and educated at Granville, Ohio. She married James S. Catherwood and soon after began a series of historical romances with French Canada as their background. She also wrote several novels concerning life in Illinois and its neighboring states.

CATHETER, instrument for passing through a duct or channel for purpose of withdrawing fluid or restoring potency of tube; used for clearing Eustachian tube and for withdrawing urine from the bladder.

CATHOLIC APOSTOLIC CHURCH, religious sect due to preaching of Edward Irving, though not constituted by him; formed, 1831, and reconstituted, 1835; it has a central church in Gordon Square, London, W.C., and other churches in Britain and U.S.A. Its type of worship is Catholic rather than Protestant, and it recognizes Rom., Gk., and Anglican Orders.

CATHOLIC CHURCH. See ROMAN CATHOLIC CHURCH.

CATHOLIC CHURCH, term used in the early cent's to indicate the Christian Church as a whole. Its application in modern times is a matter of dispute, for while Roman Catholics hold that they alone are C's, an influential section of the Church of England, claiming an essential unity with the pre-Reformation Church, for this reason claims also the title C.

CATHOLIC EMANCIPATION. In 1780 the British Parliament passed a bill freeing Roman Catholics from their most oppressive disabilities; but the Emancipation Act was not passed until 1829, when the Duke of Wellington had to introduce a bill throwing open to Roman Catholics the Houses of Parliament and most public offices. Some minor restrictions have since been removed, and as the law now stands, only the sovereign, the regent (when there is such), the lord high chancellor, and the lord high commissioner to the Church of Scotland, must not be Roman Catholics.

CATHOLIC EPISTLES (OR GENERAL E.), applied to James, 1 and 2 Peter, Jude, and 1, 2, and 3 John; title first found at end of II. cent., due,

CAST IRON. See IRON AND STEEL.

CASTLE (Lat. *castellum*, fortress), word introduced into England by the Normans to describe a stone defensive building, which took the place of the Saxon *burgh*, a timber palisade encircling the top of a mound, which was the only kind of a fortification then known in Britain. William I. introduced the square stone keep of which the 'White Tower' in the Tower of London is a notable example. Upwards of 100 ft. square, with walls of rubble and mortar, 15 ft. in thickness, such a structure was practically impregnable against the battering weapons of that day. A more common type of the Norman c., however, was the 'shell-keep,' an encircling stone wall, in place of the wooden palisade. Living apartments and offices were afterwards built against the inner sides of these walls, while from the large central space sprang the keep or *donjon*, square or round; this being very strongly built, and usually containing the well, served as the last defense of the garrison if the outer defenses were carried.

CASTLE, EGERTON (1858-1920), Eng. author; was for some years on staff of *Saturday Review*, 1855-94; pub. *Schools and Masters of Fence*, 1884; and *English Book Plates Ancient and Modern*, 1891. With Agnes Castle, his wife, wrote other novels: *Consequences*, *Young April*, *Incomparable Bellairs*, *The Secret Orchard*, etc.; has also produced plays: (e.g.) *Saviolo*, *The Pride of Jennico*, etc.

CASTLE, VERNON (1887-1918), English actor, dancer and aviator, was b. at Norwich, England, this being the stage name of Vernon Castle Blythe. He was educated as a civil engineer at Birmingham University. He made his first appearance on the stage in 1907 at the Herald Square Theatre, New York, later playing minor parts in various productions. Having developed a talent for dancing, he opened a dancing school, which proved extremely successful, and after his marriage to Irene Foote (Mrs. Vernon Castle) in 1911, he devoted himself entirely to exhibition dancing and to teaching. Soon after the outbreak of the war, he took up flying and received his pilot's certificate in 1916, a month later becoming attached to the British Royal Flying Corps. He served in France for a year, but was killed at Fort Worth, Texas, while serving as instructor with the Canadian contingent of the Flying Corps which had been transferred there for winter training.

CASTLE DOWNING (52° 52' N., 1° 22' W.), town, Leicestershire, England; manufactures hosiery and silk; breweries.

CASTLE RISING (52° 48' N., 0° 28' E.), village, Norfolk, England; remains of famous Norman castle of XII. cent.

CASTLEBAR (53° 52' N., 9° 17' W.), town, capital of County Mayo, Ireland; market for agricultural produce; scene of massacre of Eng. garrison by Irish, 1641. Pop. 4,000.

CASTLEFORD (53° 44' N., 1° 21' W.), town, on Aire, West Riding, Yorkshire, England; glassworks. Pop. 25,000.

CASTLE-GUARD, in feudal times the great barons were required to provide knights to guard royal castles, but eventually a money payment was imposed upon them, known as 'castle-guard rent.'

CASTLEMAINE (37° 4'S., 144° 14'E.), town, Victoria, Australia; gold mines were among first discovered in Australia; Pop. 6,000.

CASTOR AND POLLUX (classical myth.), also called 'The Dioscuri,' twin sons of Zeus and Leda; presided over games; patrons of hospitality; protectors of sailors, who sacrificed to them when they came to the masthead as a fire (St. Elmo's fire). C. and P. names of two bright stars in constellation Gemini; C. is a double star, but P. is brighter.

CASTOR OIL, oil obtained from the seeds of a plant, *Ricinus communis*, belonging to the order Euphorbiaceae, grown in most tropical and sub-tropical countries. The seeds are very poisonous, and the oil is obtained from them by crushing or by decoction, and purified. It is viscid, colorless, with slight characteristic smell and taste, and is used medicinally as a purgative.

CASTRATION, the removal of the testicles; when performed on a child prevents the growth of hair on the face and increase in size of larynx; has been practiced on professional singers to produce a high-pitched voice, and is common in East.

CASTREN, MATTHIAS ALEXANDER (1813-53), Finnish philologist; undertook adventurous journeys through Lapland and Siberia; pub. several valuable works on philology.

CASTRES (43° 36' N., 2° 14' E.), town, on Agout, Tarn, France; interesting buildings; fine promenades; XVI. cent. Huguenot stronghold; woolen fabrics. Pop. 20,000.

CASTRIES (13° 45' N., 61° W.), port, capital, St. Lucia, W. Indies; exports sugar. Pop. 7,000.

N. C. CASTRO, CIPRIANO (1863), president of republic of Venezuela, 1899-1908; was instrumental in deposing Andrade, 1899; his financial measures led to dispatch of punitive expedition by Great Britain and Germany, 1903, and afterwards embroiled him with Americans, French, and Dutch; was deposed, 1918, and succeeded by General Juan Gomez.

N. P. CASTRO, KASTRO.—(1) (39° N., 26° 45' E.) capital of Mitylene (Lesbos), Aegean Sea. Pop. 20,000. (2) (39° 53' N., 25° 2' E.) town, Lemnos, Aegean Sea.

CASTRO URDILALES (42° 35' N., 3°

CASUISTRY, ecclesiastical case law or moral science; sprang up in the R.C. Church with the system of confession, made obligatory by Lateran Council, 1215. C. has taken sinister meaning from ingenuity displayed in arguing away ambiguous acts.

CASUS BELLI, term in international law for offense which makes war justifiable.

CAT, name for a family of carnivora, (*Felidae*), comprising lion, tiger, leopard, puma, wild cat, etc., but usually restricted to the latter species, (*Felis catus*), the domestic cat, (*F. domestica*) and other small forms, such as the Nubian gloved cat, (*F. maniculata*). The domestic cat, of which the tabby, usually grey, with light stripes, tortoise-shell, Angora, Manx, Maltese, Persian, with green eyes and silverish fur, Blue Persian, slate grey with amber eyes, and Spanish are among the better-known varieties, has been a companion of man since the dawn of society, and figured largely in the folk-lore of Aryan and other nations, and was associated with magic and religion. Although the domestic c. when running wild assumes the habits and coloring of the wild c., evidence tends to show that the former is a distinct species.

CAT-BIRD, name applied to two distinct Passerine birds—to the Amer. *aleoscopes carolinensis*, one of the Amer. mocking-birds, a member of the thrush family, and to Australian *Aeluroides viridis*, one of the birds of paradise.

CATERPILLAR. See **LEPIDOPTERA**.

CAT FAMILY (*Felidae*), a family of carnivores, sub-order *Fissipedia*, with about 85 species scattered all over the world, except in Australia, New Zealand, and Madagascar. They are characterized by their completely retractile claws, their short faces, and the reduced number of their cheek teeth, which typically number four in the upper and three in the lower jaw. Among the cats the best known is the lion, *Felis leo*, characterized

by its uniform tawny color, and by the shaggy mane that ornaments the head and neck of the male. The lion sleeps by day in thickets or in dense reeds, and prowls at night in search of the large animals—antelopes, giraffes, camels, buffaloes, and such-like—that form its prey. Although now confined to Africa, Persia, and N.W. India, lions were formerly found, in historic times, throughout S. Asia and S.E. Europe, and fossil remains, Pleistocene, have been found even in Britain.

Closely related to the lion, but differing in its striped coat and lack of mane, is the tiger (*F. tigris*), which is found only in Asia, but there from the snows of Manchuria to the south of India. The individuals inhabiting the colder regions have long, thick coats, very different from those of their tropical brethren.

The leopard, *F. pardus*, also known as pard and panther, is less numerous than the preceding species, and is spotted with dark brown and black, the spots often arranged in circles. It occurs throughout Africa and the greater part of Asia, and its bones have been found in Brit. caves.

The snow leopard or ounce, *F. unica*, with longer and paler fur than the last, inhabits the lofty plateaus and mountains of Central Asia, 9,000 to 18,000 ft. above sea level.

Less important and less imposing Old World cats are the smaller tiger cats of tropical Asia and Africa; the S. African serval, *F. serval*, short tailed, large eared, black spotted; the clouded leopard, hunting leopard, or cheetah, and common wild cat; the caracal or Persian lynx, *Lynx caracal*, with bright yellow-brown unspotted fur and black-tipped tail, found in W. Asia and Africa; and the true lynxes, *Lynx*, with long limbs, short tail, and ears with a tuft of hairs at the tip, some of which occur both in Europe and in Asia.

The New World fauna also includes true lynxes, confined to N. America; but its most important members are the leopard-like jaguar, *F. onca*, fond of climbing and feeding upon monkeys, and the smaller puma or cougar, *F. concolor*, known to Americans as the 'panther.' Both occur from Patagonia to the U.S.; but while the northern boundary of the former is limited by N. Mexico, the latter extends to New England. Smaller arboreal species roam the woods of tropical America, passing, on account of their spotted fur, under the name of ocelot cats, or sometimes 'tiger cats;' examples are *F. jaguarundi* and *F. eyra*, respectively, rather larger and rather smaller than the domestic cat.

The remains of more than 80 species of the cat family have been found as

CATHOLIC LEAGUE

probably, to their being addressed to Christians in general, except 2 and 3 John, which are included because of close connection with 1 John.

CATHOLIC LEAGUE, formed 1609 under the influence of the Counter-Reformation; counterblast to Prot. Evangelical Union, founded 1608; both associations played prominent part in Thirty Years War (*q.v.*).

CATHOLIC SUMMER SCHOOL OF AMERICA, higher educational institution at Plattsburgh, N. Y. It was organized in 1892 and received its charter in the following year. There are courses in history, ethics, science, pedagogy, anthropology, philosophy, sociology, literature and religion. Lectures are given also by eminent specialists. The school is beautifully situated on Lake Champlain.

CATHOLIC UNIVERSITY OF AMERICA, institution of higher education under the auspices of the Roman Catholic Church and located in Washington, D. C. The establishment of the university was determined on in the Third Plenary Council, 1884. Academic work was inaugurated in 1889 and in 1895 the Schools of Philosophy and Social Science were opened. Some of the courses are only open to graduates but most are available for undergraduates. Ten colleges and 112 high schools in various parts of the country are affiliated with the University. Many publications are issued by the University Press. In 1923 the institution had 1,835 students and the faculty comprised 90 members.

CATILINA, LUCIUS SERGIUS CATILINE (c. 108-62 B.C.), Rom. conspirator; of poor patrician family; having held all lower public offices, he was an unsuccessful candidate for the consulship, 65 B.C. Two years later he organized a revolutionary plot, but his designs were frustrated by the vigilance of the Consul Cicero, in a conflict with whose troops C. was killed; noted for his bravery and military talents. His life was the subject of tragedies by Ben Jonson and Crébillon.

CATINAT, NICOLAS (1637-1712), marshal of France; served in the Flanders campaign, 1676-78; conquered Savoy, 1690; during War of Span. Succession was placed in command of the Ital. operations, but, after a reverse at Carpi, 1701, was superseded by Villeroy.

CATLIN, GEORGE (1796-1872), Amer. student of the Indians, whom he carefully portrayed with brush and pen.

CATO STREET CONSPIRACY, 1820; plot to murder Lord Castlereagh; con-

CATSKILL

sidered responsible for Tory repressive measures, the conspirators meeting in Cato St., London; conspirators hanged or transported.

CATO, DIONYSIUS, supposed author of the *Calonis Disticha de Moribus*, who is believed to have lived during the III. or IV. cent. A.D., though nothing is known of his life. The work consists of aphorisms, written in dactylic hexameters, which enjoyed considerable vogue during the Middle Ages. Caxton pub. an Eng. translation by Benedict Burgh.

CATO, MARCUS PORCIUS, THE CENSOR (234-149 B.C.), Rom. statesman; distinguished himself at the capture of Tarentum, 209, and in the second Punic War; elected Censor, 184, and Consul, 195. He was severe in his habits of life, strove hard to stem the tide of luxury, and earnestly desired a return to the primitive ways of a pastoral life. Of his many writings *De Re Rustica* is alone extant.

CATO, MARCUS PORCIUS, OF UTICA (95-46 B.C.), Rom. philosopher, known as *Uticensis* to distinguish him from his great-grandfather, 'the Censor'; belonged to the Stoic school, and was distinguished by his morality in a very corrupt age. In the war between Caesar and Pompey he attached himself to the cause of the latter, and stabbed himself in Utica rather than fall into the hands of the conqueror. C. is the subject of a tragedy by Addison.

CATO, PUBLIUS VALERIUS (b. 100 B.C.), Rom. grammarian and poet of the Alexandrian school. Besides grammatical works, he wrote a number of poems, but, above all, is noteworthy for influence he exercised upon public opinion in regard to the lit. of his day.

CATORCE (23° 50' N., 101° 2' W.), town, Mexico; tin and silver mines. Pop. 10,000.

CATS, JACOB (1577-1660), Dutch poet; familiarly known as 'Father Cats'; b. Brouwershaven, Zeeland, where a statue was erected to his memory in 1829; ed. for law; ambassador to London, 1627; was knighted by Charles I. He was author of several vol's of poetry of a didactic and humorous character, which were immensely popular in Holland. He also wrote his autobiography, pub. at Leyden, 1734.

CATSKILL, a village of New York, the county seat of Greene co. It is on the west side of the Hudson river, and on the West Shore and Catskill Mountain railroad. It is connected with the New York Central on the east side of the Hudson, by ferry, which crosses the river 30 miles

South of Albany. Catskill is a famous summer resort. It has a court-house, opera house, academy, excellent public schools, banks, and many hotels. Pop. about 5,000.

CATSKILL AQUEDUCT. See AQUEDUCT.

CATSKILL MOUNTAINS, a chain of mountains formerly a part of the Appalachian System. It begins in Greene county, New York, on the west side of Hudson river. The mountain scenery is unusually picturesque. From the higher points many interesting views can be obtained, including a radius from the Green Mountains of Vermont, to the Highlands of West Point. An interesting natural development is 'Caaterskill Cove,' in which two streams unite in an unbroken fall of 180 feet, afterwards flowing over the falls of 80 and 40 feet. The highest peaks in the system are Slide Mountain, 4,204 feet, and Hunter Mountain, 4,025 feet. The State has taken a portion of the system for a park. The region is a famous summer resort for residents of New York and other cities. Many railroads have been built making the mountains accessible. For the most part they are still thickly wooded with oak, ash, pine and maple trees.

CATT, CARRIE LANE CHAPMAN, an American publicist, b. in Ripon, Wis. She was educated at the State Industrial College of Iowa and for several years taught in that State. In 1884 she married Leo Chapman, who d. two years later, and in 1889 she married G. W. Catt. She was an ardent advocate of woman suffrage and traveled extensively in the interests of the movement in the United States and Europe. She was chosen president of the International Woman Suffrage Alliance in 1904, and of the National American Woman Suffrage Association in 1915. She was one of the most prominent leaders in the campaign for the woman suffrage amendment to the Federal Constitution passed by Congress in 1919.

CATTARO (42° 23' N., 18° 33' E.), fortified seaport, Dalmatia, Austria, at head of bay of C., enclosed by Montenegrin mountains; has spacious harbor; seat of R.C. bp.; formerly capital of small republic; joined Venice, 1420; finally ceded to Austria, 1814. Pop. 3,100.

CATTEGAT, KATTEGAT (56° 50' N., 11° E.), arm of N. sea, separating Jutland from Sweden.

CATTELL, JAMES MCKEEN (1860), psychologist, was b. at Easton, Pa., and educated at Lafayette College, Gottin-

gen, Leipzig, Paris and Geneva. For three years he was a student and assistant at the University of Leipzig, and in 1888 was a lecturer at the University of Cambridge. He later became professor of psychology at the University of Pennsylvania, and then of Columbia University, from 1902-5 being head of the department of philosophy at the latter university. He was a member of many learned societies, and has been editor of several scientific periodicals.

CATTERMOLE, GEORGE (1800-68); Eng. artist; b. Dickleburgh, Norfolk; chiefly known as a water-color artist and book illustrator, but after 1850 he painted numerous pictures in oils; he excelled in treatment of hist. and military subjects; illustrated Waverley Novels.

CATTI, CHATTI, Germanic tribe of Rhine district, mentioned by Romans in III. cent.

CATTLE. See BEEF; MEAT PACKING; FARM ANIMALS; FEEDING FARM LIVESTOCK.

CATULLUS, GAIUS VALERIUS (c. 87-54 B.C.), the greatest of Roman lyric poets; his works consist of 116 poems, varying in length from a few lines to upwards of 400 lines, some written in hexameter and elegiac measure, the greater number being brief lyrics. Perhaps most perfect of his poems are the series, covering a period of several years, addressed to Clodia, sister of Publius Clodius Pulcher, whom he has immortalized under the appellation of 'Lesbia.'

CAUB, KAUB (50° 5' N., 7° 46' E.); town, on Rhine, Pruss. province of Hesse-Nassau, Germany; exports wine; Blucher and his army crossed Rhine at C., Jan. 1, 1914.

CAUCA (c. 5° N., 77° W.), department, Colombia, S. America; rich in minerals; has most productive platinum mine in America; capital, Popayán; area, 20,403 sq. miles. Pop. 239,000.

CAUCASIA, a general name for a former part of the Russian Empire (38°-46° N., 38°-50° E.); it includes Georgia, Circassia, part of Armenia, Abkhasia, Mingrelia, Shirvan, Daghestan; territorial changes following Russian revolution, Feb., 1917, and World War, 1914-18, not yet completed, but republics have been established in Georgia, Azerbaijan, and Kars, while Armenia claims part of the area. For part in World War, see ARMENIA.

CAUCASIAN RACE. See ANTHROPOLOGY.

CAUCASUS, lofty range of mts., Russia ($42^{\circ} 30' N.$, $45^{\circ} E.$), extending from Taman peninsula, between Zzov and Black Sea, to Caspian; total length, 940 m.; forms boundary between Europe and Asia. Highest peaks are Mt. Elbruz (18,345 ft.), Koshtantau (16,875 ft.), Kazbek (16,546 ft.). Range consists of a core of granite and gneiss, flanked by clay slates, probably of Palaeozoic age. Some of the highest peaks are volcanic in origin, but there are no active volcanoes, though earthquakes are frequent. The Little Caucasus in Armenia, connected with main range by short Suram range, culminates in the Kapujikh (12,855 ft.). Freshfield, *Exploration of Caucasus*.

CAUCHON, PIERRE (d. 1442), Fr. ecclesiastic; bp. of Beauvais, 1420; driven from his see, 1429, owing to his overbearing manners, he attached himself to the interests of Henry VI. of England. He bears the inglorious distinction of having been the accuser and judge of the Maid of Orleans, whom he afterwards handed over to the secular authorities. He was excommunicated after death by Calixtus IV. and his body thrown into a ditch.

CAUCHY, AUGUSTIN LOUIS BARON (1789-1857), Fr. mathematician, prof. of Math's, École Polytechnique, 1815, Collège de France, and Univ. of Paris; prof. Mathematical Astron., 1848.

CAUCUS is a word whose derivation is still a moot point. About 1725 it appeared in Boston as the name of a political club. In America it is still restricted to a meeting of party managers who choose the candidates to be proposed at the forthcoming election or to select delegates for a nominating convention. In England the term is applied in a derogatory sense to such a rigorous system of party organization as Mr. Joseph Chamberlain introduced at the foundation of the Birmingham Liberal Association in 1878, when it became almost a principle that voters must vote with their party.

CAUDEBEC LES ELBEUF ($49^{\circ} 15' N.$, $1^{\circ} 4' E.$), town, Seine Inférieure, France; woolens; Rom. remains. Pop. 11,300.

CAUDINE FORKS, FORCULÆ CAUDINÆ (c. $41^{\circ} N.$, $14^{\circ} 30' E.$), two mountain gorges in ancient Samnium, Italy, leading to and from plain surrounded by mountains; here Samnites forced Romans to surrender, by barring both exits against them after they entered the valley, 321 B.C.

CAUDLE (O. Fr.), a hot drink con-

sisting of gruel, wine and spice.

CAUL, a close-fitting woman's cap, often of gold net, worn from XIV. to XVI. cent.'s; a portion of the membrane enveloping the foetus, and sometimes covering the child's head at birth; such children are supposed to have a very fortunate future; these cauls are also held to be a safeguard against drowning, and they have often been sold for high prices. The fringe beneath the head of a halberd was also known as a 'caul.'

CAULAINCOURT, ARMAND AUGUSTIN LOUIS, MARQUIS DE (1773-1827), Fr. general and statesman; as an aristocrat he was imprisoned during the Revolution, but escaped, and eventually rose to eminence under Napoleon, who made him Duke of Vicenza, of which he was afterwards deprived. He accompanied the Emperor in the Russ. campaign. During the 'Hundred Days' he acted as Foreign Minister.

CAULKING, or **CALKING**, process of making seams and joints air and water-tight; seams of ship's deck planks caulked by driving oakum (unravell'd rope) into them and covering with melted pitch or resin. Lap joints in boilers and tanks caulked by beating out metal of upper plate; done by pneumatic hammers.

CAUSATION, conception of operation of causes throughout the universe. In metaphysics, sequence of cause and effect leads back to infinite series, whence Problem is the First Cause; in psychology, the problem of the origin and validity of the notion. According to Locke, causation implies power, due to reflection on ourselves as causes; Hume affirms causation subjective, expectation due to custom; Mill, the invariable and unconditional sequence between phenomena.

CAUSEWAY (old form 'causey'), mound or embankment across marshy ground; paved highway; cobbled pathway.

CAUSSES ($44^{\circ} 30' N.$, $3^{\circ} 20' E.$), series of limestone plateaus, near headwaters of Tarn, southern France.

CAUSTIC is the term applied to a powerful irritant drug which, when applied locally to a part of the body kills the part to which it is immediately applied, and causes dilatation of the blood-vessels in the area surrounding; (e.g.) nitric acid (concentrated), silver nitrate, arsenious acid, zinc chloride.

CAVAIGNAC, LOUIS EUGENE, (1802-57), French soldier and politician, born in Paris. Entered the army as an

engineer in 1824; served in Morea and afterwards in Algeria where he won great distinction. In 1848 the provisional government made him governor-general of Algeria, but the troubles of the revolutionaries in Paris led to his recall as Minister of War. He was appointed dictator to quell the insurgents, and drove them with great bloodshed to the barricades. In the same year he was made President of the Council. He was defeated as a candidate for the presidency of the republic by Louis Napoleon and retired into the ranks of the Opposition, which led to his imprisonment at the *coup d'état* of 1851. On his release he retired into private life until his death. See *Life* by Deschamps, 1870.

CAVALIER, term used in Shakespeare's day for a swaggering gallant and in this sense applied by the Puritans of the 17th cent. to the adherents of Charles I. It was, however, adopted as a title of honor by the Royalists, who dubbed their close-shorn opponents 'Round-heads.'

CAVALIERE, EMILIO DEL (b. 1550), Ital. composer; employed at court of Francis I. of Tuscany, 1588-97; first composer of sacred musical dramas, or 'oratorios,' as they came to be called later.

CAVALIERI, LINA (MRS. LUCIEN MURATORE), (1874). Studied music under Mme. Mariant-Mase. Made her debut in Lisbon, Portugal, in 1900 and in America at the Manhattan Opera House, New York City, 1906. She married Lucien Muratore, opera singer.

CAVALLI, FRANCESCO (d. 1676), Ital. composer; as a youth he became a singer at St. Mark's, Venice, was later organist there, and subsequently *maestro di cappella*; was first Italian to popularize opera, upwards of twenty of his own compositions in this kind being preserved in the library of St. Mark's.

CAVALLINI, PIETRO (1279-1364), Ital. artist; b. Rome; studied under Giotto; executed a large Crucifixion fresco at Assisi; some of his best work is to be found in Santa Cecilia in Trastevere, Rome.

CAVALLOTTI, FELICE (1842-98), Ital. democratic reformer and poet; fought in Garibaldian troops, 1860 and 1866; pub. lampoons against monarchy in Milanese newspapers, 1866-72; twelve years leader of reform party; fought over thirty duels, in the last of which, with Count Macola, he was killed.

CAVALRY, the general name for mounted troops. The horse was first

used in war to draw the chariot from which the warrior fought, the charge of chariots being also used to break up infantry (see the Homeric poems and the early Egyptian monuments). Even when men had learned to ride, infantry for a long time made up the main strength of armies. Cavalry was first developed among Asiatic peoples in countries where there was an abundant supply of horses. The Pers. cavalry was a formidable force until it was successfully met by the Macedonian cavalry of Alexander. Many of the barbarian armies which broke up the Roman Empire, (e.g., the Huns) were bands of mounted warriors coming originally from the Asiatic steppes.

Later, in the W., the Normans developed the formidable force of knights and men-at-arms, armored riders, armed with lance, sword, and battle-axe, who for three centuries easily rode down the levies of badly armed burgher and peasant infantry. But in the 14th cent. came a great change. Flemish burghers with well-drilled civic militia showed how a bristling hedge of spears could resist a mounted charge. Eng. archers at Crécy and Agincourt proved that the arrow shower could destroy heavily armed horsemen before they could come to close quarters. The Swiss Confederates showed how the charging phalanx of pikes and halberds could break up an array of knights and men-at-arms, whether mounted or on foot. Infantry then began to form a larger proportion in European armies, and the introduction of firearms gradually increased its fighting power; but up to the period of the Napoleonic wars cavalry was still an important element in armies, and often broke into and destroyed infantry, even in square. Napoleon was the first to use masses of horsemen to cover the march of his armies and explore his front while concealing his own movements. In the 19th cent. the introduction of the breech-loader and the repeating rifle made it impossible for cavalry to break steady infantry, even in line or in dispersed order. The work of cavalry now became (1) reconnaissance and outpost duties; (2) dismounted action in battle after the manner of the old dragoons; (3) pursuit of a broken and beaten enemy. Mounted charges in battle became rare, and mostly failed disastrously, but were occasionally employed as a desperate expedient to hold an enemy, regardless of cost.

At the present day, aerial reconnaissance does much of the work which was formerly assigned to cavalry, but in wooded and close country and in certain states of the weather cavalry has still to be used for this purpose. A force of

cavalry and horse artillery is still of the highest value for reaping the results of victory: witness Wolseley's seizure of Cairo after Tell-el-Kebir and Allenby's destruction of the Turk. army in Palestine by sending his mounted troops round their beaten right flank in the final battle of the campaign of 1917.

CAVAN (54° N., 7° 21' W.), county, Ulster, Ireland; bounded by Fermanagh, Monaghan, Meath, Westmeath, Longford, Leitrim; area, 746 sq. miles; surface undulating; N.W. mountainous; watered by Annalee, Blackwater, Erne, Woodford; mineral springs; soil poor; agriculture chief industry; distilling, linen-bleaching; chief town, Cavan. Pop. 91,000.

• **CAVAN** (53° 59' N., 7° 22' W.), market town, capital of C. County, Ireland; has remains of XIV.-cent. abbey.

CAVAN, FREDERICK RUDOLPH LAMBERT, 10TH EARL OF (1865) succeeded his father, 1900; served in S. Africa, 1901, and in the World War commanded 14th Corps, B.E.F. Brigade of Guards, and subsequently Guards Div. (mentioned in dispatches seven times); promoted lieut.-general, and was in charge of operations on the Plave front, 1918. See under ITALY.

CAVANILLES, ANTONIO JOSÉ (1745-1804), Span. ecclesiastic and botanist.

CAVATINA (Ital.), a simple melody as distinguished from the *aria* in operas or oratorio.

CAVE, EDWARD (1691-1754), Eng. publisher; founded 1731 and edited (as 'Sylvanus Urban, Gent.') the *Gentleman's Magazine*, which brought him a large fortune. He gave Dr. Johnson his first literary employment as parliamentary reporter for the magazine.

CAVE, WILLIAM (1637-1713), Eng. ecclesiastic; made canon of Windsor, 1684, and was chaplain to Charles II.; he pub., 1677, *Apostolici*, (Lives of the Fathers) and *Scriptorum Ecclesiasticorum Historia Literaria*, 1688.

CAVE ANIMALS, term sometimes applied to cave bear, cave hyena, cave lion, etc., whose fossil remains are found in Pleistocene cave deposits in W. Europe. True cave-dwelling animals, however, live, reproduce, and die in the obscurity of extensive caverns (e.g.), *Proteus anguineus* (discovered in 1768 in Carniola), minute protozoa, molluscs, insects, crustaceans, fishes, frog-like animals, such as blind rat, *Nestoma* (discovered in Mammoth Cave, Kentucky). All are modified descendants of

external forms adapted to surroundings through long residence in darkness.

CAVEAT (Lat.), 'let him beware'—as to file a *caveat* in a probate court opposing the proving of a will; to enter a *caveat* against the granting, or renewal, of a patent. *C. emptor*, a legal maxim which means that a purchaser, (*emptor*) must look after himself, the seller not being bound to disclose secret faults, though he may not conceal them.

CAVELL, EDITH (1866-1915), Eng. nurse and martyr; daughter of Rev. F. Cavell, forty years vicar of Swardston, Norfolk; trained London Hospital; became head of a hospital in Brussels, 1900; continued her work during Ger. occupation; with Prince Reginald de Croy, M. Baucq, Mme. Louise Thulliet, Mme. Bolard, etc., formed organization for helping stray Allied soldiers to escape into Holland; denounced by renegade Quilen, who became acquainted with system by pretending to be a poli needing assistance; imprisoned; tried Oct. 7, 1915; found guilty as spy; Amer. minister pleaded for her life in vain; executed Oct. 11. After Armistice, body exhumed; memorial service in Westminster Abbey; interred in precincts of Norwich Cathedral; statue in St. Martin's Lane, London, 1920.

CAVENDISH, LORD FREDERICK (1836-82), Brit. statesman; younger s. of Duke of Devonshire; became Chief Sec. for Ireland, 1882; assassinated in Phoenix Park, Dublin.

CAVENDISH, GEORGE (1500-62), Eng. historian; famous for his *Life* of Cardinal Wolsey, whom he served as gentleman-usher, and attended up to the time of his death. The work was not pub. until 1641, but it was freely circulated in MS. during C.'s lifetime, and was used by Shakespeare in *Henry VIII*.

CAVENDISH, HENRY (1731-1810), Eng. chemist and physicist; b. Nice; discovered hydrogen, 1766; described its properties, 1781; demonstrated composition of water and of nitric acid; determined density of the earth by 'Cavendish Experiment'; became member of Royal Soc., 1760; pub. researches in its *Philosophical Transactions*.

CAVENDISH, THOMAS, CANDISH (1555-92), navigator; b. Trimley, near Ipswich; sailed with Grenville to Virginia, 1585; sailed from Plymouth, 1586, with three ships, and, with John Davis, he was third circumnavigator of the globe, completing the voyage in little over two years.

CAVENDISH, SIR WILLIAM (1505-

57), ancestor of Dukes of Devonshire; enriched from spoils of the monasteries; husband of celebrated 'Bess of Hardwicke,' afterwards Countess of Shrewsbury.

CAVES, or **CAVERNS** (Lat. *cavus*, hollow), hollow places formed in the berth or in rock. They may be produced by the action of water or by the destruction and displacement of strata through an earthquake or landslip. The regular beating of waves upon the seashore wears away the softer portion of the cliff until cavities are formed. Fingal's C., Staffa, is an excellent example of marine erosion. The sand and gravel, carried up by the sea, have also a great eroding power upon rocks. In rock-salt districts large caves are formed owing to the free solubility of the sodium chloride in water. In France and Switzerland large caverns have been formed under glaciers, owing to the shifting of the ice. C. are, however, more frequently formed by the chemical than by the mechanical action of water. Carbonic acid, which is present in most waters, derived either from the air or from decaying organic matter in the soil, acts upon mineral rock-forming salts, which are carried away in solution, leaving cavities behind. Large subterranean galleries, caverns, and channels have been formed in various districts by underground streams and rivers. A river that has left its course above ground eats its way through the earth, until it can finally empty itself into the sea. Whenever such a river, for some natural cause, has abandoned its subterranean watercourse, the channel it has occupied gradually dries up, and tortuous underground passages remain, linking together the C. previously made by the water. The holes through which the rivers have descended on their downward course below the earth are known as sink-holes. The direction of the caverns and channels can frequently be ascertained above ground by examination of these entrance-holes. Fine specimens of such sink-holes are found in Kentucky and Florida.

CAVIARE, the salted roe of the sturgeon, prepared in Russia as a table delicacy, and known in Western Europe certainly as early as the XVI. cent., as is evidenced in the reference to it in Shakespeare's *Hamlet*.

CAVITE (14° 35' N., 120° 50' E.), fortified seaport, capital of C. province, Luzon, Philippine Islands; naval station; large tobacco factory. Pop. port, 5,000; province, 136,000.

CAVOUR, **CAMILLO BENSO, COUNT** (1810-61), Ital. statesman; b. Turin, of noble descent; ed. for army,

but his liberal opinions proved incompatible with a military career, and he retired, 1831; took up agriculture and did much to improve economic conditions of Piedmontese; traveled in France and England, and closely studied the Brit. constitution, which he greatly admired; entered political arena, 1848, and was successively Minister of Agriculture, Commerce, Marine, and Finance; became Premier, 1852. In 1858 he entered into a secret treaty with Napoleon with a view to driving the Austrians out of Italy; he encouraged the efforts of Garibaldi; and the dream and struggle of his life was to found a united Italy, which he lived to see an accomplished fact. C. was one of the greatest statesmen of modern times.

CAVY FAMILY (*Caviidae*), a New World family of Rodents, with about 20 species. They are generally less than a hare in size and resemble in appearance the Guinea-Pig (*Cavia*), which is a domesticated species; but S. American Cavybara (*Hydrochoerus cavybara*) is the largest living rodent, reaching a length of 4 ft.

CAWDOR (57° 32' N., 3° 55' W.), village, Nairnshire, Scotland; C. castle is supposed scene of traditional murder of King Duncan by Macbeth, 1040.

CAWNPORE, KANPUR (26° 28' N., 80° 24' E.), chief town, district of C., United Provinces, Brit. India, on Ganges; important railway center; military station; memorial gardens and church commemorate massacre of Europeans by Nana Sahib, July 1857; manufactures leather goods, and has large trade in grain. Pop. 1921, 213,044.

CAXIAS (5° 7' S., 42° 50' W.), town, Maranhão, Brazil. Pop. 25,000.

CAXTON, WILLIAM (1422-91), first Eng. printer; b. in the Weald of Kent; apprenticed to a London mercer, after whose death he went to Bruges to complete his apprenticeship, was successful in business, and became gov. of the Company of Merchant Adventurers in the Low Countries. Afterwards he entered the service of Margaret, Duchess of Burgundy, sister of Edward IV., and about this time he learned the art of printing. Returning to England in 1476, he set up his printing-press at the Red Pale in the Almonry of Westminster. His first book known to have been printed in England was the *Dictes and Sayings of the Philosophers*, 1477; but he had already printed in English at Bruges the *Recuyell of the Histories of Troye* (1474), and the *Game and Playe of Chesse*. He printed, among other books, the principal works of Chaucer, Gower, Lydgate,

CAYENNE

and Sir Thomas Malory's *Morte d'Arthur*, and was himself the translator of numerous works.

CAYENNE (4° 56' N., 52° 20' W.), fortified seaport, capital of Fr. Guiana, on C. Island, at mouth of C. River; exports gold, woods, spices; gives name to well-known pepper; formerly Fr. penal settlement. Pop. 12,600.

CAYENNE PEPPER, preparation from species of capsicum (principally *Capsicum fastigiatum*), the fruits being known as chillies. C. is hot and pungent, due to presence of alkaloid *capsicine*; used as spice and stimulant in medicine.

CAYES, LES (18° 12' N., 73° 30' W.), port, Haiti, W. Indies; coffee. Pop. 12,000.

CAYEY (18° N., 66° 24' W.), town, Porto Rico; summer resort; produces coffee and tobacco. Pop. 4,000.

CAYLEY, ARTHUR (1821-95), Eng. mathematician; b. Richmond (Surrey); senior wrangler and Fellow of Trinity Coll., Cambridge, 1842; Sadlerian prof. of Math's, 1863; delivered famous address, Brit. Association, 1883; wrote extensively on mathematical subjects.

CAYLUS, ANNE CLAUDE PHILIPPE, COMTE DE (1692-1765), Fr. archaeologist; b. Paris; served in Span. War of Succession; traveled in Greece, Italy, England, and Germany, collecting antiquities; was a noted engraver; his chief publication was *Recueil d'Antiquités égyptiennes, étrusques, grecques, romaines, et gauloises* (7 vols., 1752-67).

CAYLUS, MARIE MARGUERITE, MARQUISE DE (1673-1729), Fr. writer; mother of Mme de Maintenon, and author of scandalous *Souvenirs*.

CAYMAN ISLANDS (19° 44' N., 79° 44' and 80° 26' W.), three islands, Caribbean Sea, N.W. of and under government of Jamaica; discovered by Columbus; staple production, turtles.

CAYUGA LAKE, lake of New York State, lying partly in Tompkins co., and forming the boundary between Cayuga and Seneca cos. Length, 38 m.; average width, 4 m. At the head lies Ithaca.

CAZALLA DE LA SIERRA (37° 56' N., 5° 51' W.), town, Seville, Spain. Pop. 9,000.

CAZEMBE, hereditary name of African chief originally occupying territory between the Mweru and Bangweulu lakes. From the XVIII. cent. onwards the C. was a ruler of great power and influence. David Livingstone visited the C. in 1868. The country now forms

CECIL

part of Rhodesia and the Belgian Congo, and the latter division is the center of a thriving copper industry.

CAZIN, JEAN CHARLES (1840-1901), Fr. landscape artist; spent some time in England, and his earlier pictures were influenced by Pre-Raphaelite movement; later successes, *Souvenir de fête*, 1881, and *Journée faite*, 1888; officer of Legion of Honor.

CAZOTTE, JACQUES (1719-92), Fr. author; held official appointments until middle life, when he turned his attention to authorship; wrote romances, Oriental tales, and narrative poems; was best known as author of a fantastic romance, *Diable amoureux*, 1772.

CEARA (5° S., 39° W.), maritime state, N. Brazil; area, 40,247 sq. miles; has Serra Grande and Serra Araripe in W.; drained by Jaguaribe, Acaraú; capital, Fortaleza; climate healthy, but hot; droughts occur; produces coffee, cotton, medicinal plants, sugar, fruits, wax, rubber; cattle raised; minerals include iron, copper, salt. Pop. 1,436,000.

CEAWLIN (d. 593), king of West Saxons; obtained many victories over the Brit. kings; destroyed Uriconum (near Wrekin) and Pengwyrn (Shrewsbury); was himself finally overcome, and d. in obscurity.

CEBU (10° 20' N., 123° 57' E.), port of entry, Cebu Island, Philippines; chief commercial city; cathedral; exports hemp, tobacco, sugar. Pop. 46,000.

CECCANO (43° 33' N., 13° 21' E.), town, Rome, Italy. Pop. 10,000.

CECCO D'ASCOLI (1257-1327), Ital. encyclopædist and poet; is chiefly known as author of the *Acerba*, an encyclopædic poem in four books covering the entire gamut of the then known arts and sciences, morals, etc. (numerous editions); tried for impiety at Florence, found guilty, and burned at the stake.

CECIL, noble Eng. family, of which there are two distinct branches. William Cecil, Lord Burghley, Queen Elizabeth's great minister; b. Bourne (Lincoln); belonged to the Stamford Cecils; he m. (1) Mary Cheke, by whom he had a s., Thomas, cr. by James I. 1st Earl of Exeter; m. (2) Mildred Cooke, who bore him a s., Robert, cr. by James I. Lord C. of Essendene, Viscount Cranborne, and Earl of Salisbury, 1605. Thus the Hatfield Cecils are a younger branch of the family. A marquessate was given to the 10th Earl of Exeter (i.e., the Stamford line) in 1801, who m. Sarah Hoggins, a Shropshire farmer's dau.; their story has been celebrated in song

by Tennyson. This elder branch of the family is still established at Burghley.

CECIL, RT. HON. LORD ROBERT (EDGAR ALGERNON) (1864), third s. of 3rd Marquess of Salisbury; K.C. 1900; M.P. E. Marylebone, 1906-10; Hitchin Div. since 1912; minister of blockade 1916-18; parliamentary under-secretary for foreign affairs, 1918; in which year he resigned from government; has closely identified himself with propaganda of League of Nations. He visited the United States in support of The League of Nations in 1923.

CECILIA, ST., Christian martyr; festival, Nov. 22; patron of music and blind persons. According to Fortunatus, bp. of Poitiers, she suffered martyrdom in Sicily, under Marcus Aurelius, some time between 176 and 180. A church to perpetuate her fame existed at Rome in the IV. cent., and has been several times rebuilt. She has been the theme of many artists and Dryden's famous ode, and others of less note, were written to celebrate her festival.

CECROPS, mythical founder of Athens, and teacher of arts of civilization to Attica.

CEDAR, tree of order Coniferae; *Cedrus libani* (cedar of Lebanon), *Cedrus deodara* (sacred deodara of India), *C. atlanticus* (N. Africa), furnish excellent timber; that of *C. libani* was used in building of Solomon's temple; *C. deodara* supplies a turpentine beneficial for skin diseases; *Juniperus Bermudiana* and *Cedrela toona* (a West Indian species) yield cedar wood which is used for pencils, etc.

CEDAR CREEK, a river of Northern Virginia, rising in Shenandoah co., and flowing N.E. to enter the Shenandoah R., 3 m. E. of Strasburg. Near it the Confederates, under Early, were defeated by the Federals, under Sheridan, on Oct. 19, 1864.

CEDAR FALLS, a city of Iowa, in Black Hawk co. It is on the Illinois Central and other railroads, 85 miles N.E. of Des Moines. It is the seat of the Iowa State Teachers' College, and has a hospital, Carnegie Library, and excellent schools. It is an important manufacturing city and its industries include the making of oatmeal flour, wagons, pumps, harvesters, etc. Pop. 1920, 6,316.

CEDAR MOUNTAIN, an elevation in Culpeper co., Va., where, on April 9, 1862, General Banks commanding the Union forces, was defeated by 'Stonewall' Jackson in command of the Confederate army. The Confederates held the field

for two days and then fell back to meet General Lee at Gordonsville. The Union loss was about 1,400 and the Confederate about 1,300.

CEDAR RAPIDS, a city of Iowa, in Linn co. It is on the Chicago and Northwestern, the Chicago, Milwaukee and St. Paul, and the Illinois Central and other railroads, and on the Cedar River. The city is an important trading center. Its industries include a large pork packing plant, cereal mills, corn products plant. The river supplies power for manufacturing. The city is the seat of Coe College, and is also the headquarters of the Order of Railway Conductors. It has a high school, churches, public and masonic libraries, hospitals, etc. Several bridges span the river. Pop. 1920, 45,566; 1924, 52,000.

CEDILLA, mark ç placed under letter c (soft) in French.

CEPALU (38° 1' N., 14° 3' E.), seaport, Palermo, Sicily; ancient *Cephaloedium*, cathedral and ruined castle; chief industries, marble-quarrying and fishing. Pop. 12,000.

CEGLIE (40° 40' N., 17° 31' E.), town, Italy. Pop. 17,000.

CEHEGIN (38° 5' N., 1° 48' W.), town, Murcia, Spain; wine, olive oil, and hemp chief products; fine black marble quarries in vicinity. Pop. 10,000.

CELENÆ (38° 5' N., 30° 20' E.), ancient city, Phrygia; residence of Xerxes.

CELANO (42° 7' N., 13° 35' E.), town, Aquila, Italy; birthplace of Thomas of Celano, Latin poet. Pop. 7,600.

CELAYA (20° 34' N., 100° 28' W.), town, Mexico; carpets, textiles. Pop. 23,000.

CELEBES, isl., Dutch E. Indies (1° 42' N., - 5° 42' S., 118° 45' - 125° 17' E.), separated from Borneo by Strait of Macassar; curious shape, compared with that of scorpion; great length of coast line; inhabitants belong to Malayo-Polynesian group, Bugis in S.; traversed by volcanic range; has many lakes; proximity to sea makes climate endurable; wealthiest of Dutch E. Indies; cap. Menado (pop. 760,700); no railways; much virgin soil; exports nutmeg, mace, copra, rattans, waxes, gums and resins, ores and hides, dry and salt fish, bêche-de-mer, mother-of-pearl, and tortoise-shell. Founded by Portuguese, 1525; expelled by Dutch, 1660; last of native rajahs crushed, 1908; private slave-trading and head-hunting have retarded progress. Area, 76,360 sq. m.; pop. 2,329,000.

CELERY, or *Apium graveolens*, a species of Umbelliferae. In its wild state the plant is poisonous, but when cultivated the blanched leaf-stalks are valuable as purifiers of the blood, and may be eaten raw with cheese and salt, stewed as a vegetable, or made into soup. The form known as celariac is grown on account of the turnip-like flavor of the roots, and it is used chiefly in made dishes or in sauces.

CELESTINA, LA, alternative title of the *Comedia de Calisto y Melibea*, an anonymous Span. dramatic romance which was popular in Europe during XVI. cent. (Eng. trans. by James Mabbe, 1631).

CELESTINE, name of five popes.—Celestine I., pope, 422-32, sent Palladius and St. Patrick to preach in Ireland. Celestine V., pope in 1294, abdicated same year; imprisoned by Boniface VIII.; canonized, 1313; founded *Celestines*, ascetic order of Benedictines; they wore white robe with black hood, scapular, and mantle; are now almost extinct.

CELESTINE (SrSO₄), native sulphate of strontium; occurs in Sicilian sulphur mines; transparent and finely crystalline; bright blue, red, and yellow; used in manufacture of fireworks.

CELIBACY, the unmarried state, is in several religions held to be necessary to the highest human perfection. Before Christianity it had taken root in Buddhism, and the Essenes, a Palestinian monastic order, also practiced it. In the Jewish Church priests were bound to continence at certain times only. Christ commended voluntary c., and St. Paul, while insisting on the excellence of virginity, assumed the right of bp's and priests to marriage. By II. cent. the taking vows of chastity had become a pious custom. In the IV. cent. Pope Damasus insisted on the c. of bp's, priests, and deacons of the Western Church; but for some cent's the papal decretals were ignored. In the XII. cent., however, the marriage of those in Holy orders was declared null and void, and this was confirmed by the Council of Trent. In the Eastern Church c. has never been adopted, and the practice of the modern Gk. Church is to allow candidates for Holy orders to get married, if they wish, before ordination. Marriage after ordination is not permitted, and bp's are recruited from the unmarried clergy.

CELL, the unit mass of living structure, so called because in vegetables the tissue units are enclosed in definite walls. In animal cells the outline is often not so clearly circumscribed. The simplest

organisms may be composed of a single cell (Protozoa and Protophyta), and the male and female sex elements (*gametes*) are single cells. Cells may vary in size from something smaller than the microscope can show, to the dimensions of an ostrich's egg, which is but a single cell. The reason for the large size of the female reproductive unit in birds and reptiles is found in the large store of nutrient material which it contains for the use of the embryo during the incubation period. Simple cells are spherical in shape, but cells may be faceted by their neighbors, and numerous cells are specially modified in shape in accordance with the requirements of their special function.

The essential element of a cell is its protoplasm or cytoplasm, which has usually a foam-like structure, apparently due to the presence of a supporting framework which contains a softer jelly-like substance in its meshes. In the cytoplasm there may be granules of pigment or stored food. There is generally a nucleus, which is enclosed in a membrane, and is composed of a network which readily takes up dye-stuffs, hence called *chromatin*, and a *nuclear fluid*. In the nucleus there may be one or more bodies which do not react to stains in the same way as the remainder. These are *nucleoli*. The cell membrane in vegetables is composed of cellulose, a substance allied to starch but very resistant to the human digestive juices. In animals there may be a membrane of chitin, but in most animal cells the membrane is very fine, and contains fatty substances. In growing cells a time arrives when the bulk of the cell is so great in proportion to its surface that nutrition becomes increasingly difficult. In those circumstances the cell must either die or divide. The division may take place in one of two ways. In *amitotic* division a line of cleavage appears in the nucleus, then the cell simply divides into two. This simple process is unusual, and the common process of division is that known as *mitosis* (thread-work). A body (*centrosome*) which in resting cells lies near the nucleus divides, and the two new bodies take up positions at opposite poles of the nucleus. The nuclear chromatin forms a long skein and then breaks up into a number of loops (*chromosomes*). The number of these is constant for each animal species, and in sexual cells the number becomes reduced to one half, so that the cell must be fertilized by chromatin from a cell of the opposite sex before reproduction can take place. The chromatin loops split and the halves appear to be drawn apart by a spindle of threads which

forms between the two centrosomes. After they have separated some distance, the split loops join to form a skein, the skein becomes a network, and a new nuclear membrane is formed round each. The protoplasm then divides and two new cells now replace the original larger cell. The process of division occupies about half an hour.

CELL REACTIONS. See BIOCHEMISTRY.

CELLE (52° 38' N., 10° 3' E.), town, on Aller, Hanover, Prussia; manufactures tobacco, woolen yarn, etc. Pop. 22,000.

CELLINI, BENEVENUTO (1500-71), Ital. artist, metal-worker, sculptor. Nothing but his famous and infimitable *Autobiography* can do justice to his many-sidedness. He was b. at Florence; s. of a musical instrument maker; apprenticed to a goldsmith; then took up flute-playing, and became one of the Pope's court musicians. He enjoyed considerable patronage as a metal-worker under Clement VII., but his penchant for brawling led to his constant change of domicile, and he lived at Siena, Pisa, Rome, and Florence, changing his profession as often as his place of residence. Amongst other exploits he claimed to have shot the Constable de Bourbon with his own hand during the attack on Rome, 1527. Perhaps his greatest work as sculptor is the bronze group, *Perseus holding the head of Medusa*, in the Loggia dei Lanzi, Florence.

CELLULOID, a plastic substance resembling ivory, composed essentially of soluble gun cotton and camphor, and the basis of a growing modern industry. It obtains its name from its original source, which is cellulose, from which gun cotton pulp is derived through collodion. Cellulose is an inert substance constituting the chief part of the solid framework of plants and contained in the mantle of tunicates. Celluloid was first made in England by an inventor named Parkes of Birmingham, in 1856, but its present day applications in the United States are due to a new Jersey printer, John Wesley Hyatt, who in 1869 chanced upon celluloid for making billiard balls as a substitute for ivory, elephants' tusks having become scarce. He discovered that a mixture of nitro-cellulose, camphor and a small amount of alcohol became thermo-plastic, that is, soft when heated, could be moulded in a hydraulic press, and after cooling to ordinary atmospheric pressure, again became hard and strong. The wide use of celluloid since as a substitute for natural products was less due to competition with the raw materials it displaced than to a desire to demonstrate how

universally applicable it could be made. It has become firmly established in many industries which formerly depended on the employment of substances whose supply was decreasing or not always available, such as ivory, horn, bone, hoof, parchment, whalebone, tortoise shell, coral and pearl, as well as ebony and other precious woods, gutta percha, rubber, amber, onyx, jet, malachite, lapis lazuli, jade, agate and rare marbles. It is an effective substitute for all these products. As ordinarily manufactured celluloid is highly inflammable, but various modifications of the original processes of manufacture have largely removed this disadvantage. It is applied to countless uses. The multitude of articles made of celluloid, wholly or in part, embrace all personal ornaments, such as brooches, bracelets, etc., hairpins and combs, buttons, knife handles, tooth brushes, and other toilet articles, book covers, cigarette cases and holders, traveling cases, rulers, drumsticks, serviette rings, dolls' heads and bodies, picture frames, stick, umbrella and whip handles, fans, chessman, artificial teeth, etc. It is of service in the machinery and building trades, coach building, railroad work and ship construction, and in the production of motion picture films. It is also used for screens instead of glass, for table tops, and lately it has been applied to the manufacture of type.

CELLULOSE forms the chief component of vegetable cell wall and hence of all vegetable tissues, and is the product of the vital activity of plants in building up their structure from carbon dioxide and water. It is, in chemical constitution, a carbohydrate representable by the formula $(C_6H_{10}O_5)_n$, and is obtainable pure from cotton or linen fibre by boiling out impurities with alkali, alcohol, or ether. Cotton, linen, and ordinary filter paper are nearly pure forms of cellulose. It is a white opaque substance appearing under microscope as a network of thin flattened tubes, is insoluble in water, alcohol, ether, and dissolves in an ammoniacal solution of copper hydroxide. It yields a blue color when treated with strong sulphuric acid, and if then diluted with water and boiled is converted into dextrose (grape-sugar). Unsized paper dipped into strong sulphuric acid is converted into 'parchment paper' or 'vegetable parchment.' Strong nitric, or preferably nitro-sulphuric, acid converts it, after being dried, into inflammable nitrates, made use of in gun cotton, collodion, celluloid, etc.

Cellulose treated first with caustic soda and then with carbon disulphide produces a thick brown syrup called

'viscose,' from which artificial silk is manufactured commercially. Besides being the source of valuable derivatives, cellulose itself is used in the fibrous state as cotton, linen, hemp, and jute in textile industries, and as a pulp, obtained from wood or esparto grass, in paper making.

CELSIUS, ANDERS (1701-44), Swed. physicist; prof. of Astronomy, Upsala, 1730-44; measured arc of the meridian in Lapland; devised the centigrade thermometer.

CELSUS (II. cent. A.D.), Platonic philosopher and opponent of Christianity which he attacks in his *True Word*.

CELTIBERIA, name given by Greeks and Romans to large district in N.E. Spain, peopled by the Celtiberi tribes who were formed by intermixture of Celtic invaders with Iberians in Spain.

CELTIS was name given by classical writers to all people living N. of the Alps. In Brit. history it is applied to the tall, fair-haired, blue-eyed race that invaded Britain from Gaul about the 6th cent. B.C., dominated and coalesced with the Iberian people it found there (to whom it also taught the use of iron), founded the states overthrown by the Romans, and finally, after the Anglo-Saxon invasions in the 5th cent., is popularly supposed to have been exterminated in England, and survived only in Ireland, Wales, Isle of Man, Scot. Highlands, and Cornwall, while a section crossed from the S. to France and founded the Celtic state of Brittany (Armorica).

Celtic Languages.—Celtic belongs to the Indo-European group of languages, and in its forms and inflections, so far as they are known directly or can be reconstructed. Early Celtic closely resembled Latin and Greek. Its personal names, like the Greek and Teutonic personal names, are all compounded terms, usually of two elements, of which one part qualified the other (*e.g.*), Orget-oria, 'king of slayers'; Cin-get-oria, 'king of heroes'; Cantu-māros, 'great in battle.' At an early period Celtic discarded the Indo-Germanic *p* sound initially and between vowels. Thus Latin and Greek *pro* became in Celtic *ro*; Lat. *piscis* is Gaelic *tasc*; Latin and Greek *pater* became Gaelic *athair*, 'father'; Welsh *edrydd*, 'patrimony.' At a later but still early period, Celtic divided in the treatment of the Indo-European *qu* sound, certain dialects retaining it; others changing it to *p*. Thus we have a *p* group and a *q* group of Celtic languages. Continental Celtic belonged on the whole to the *p* group, though there are some traces of retained

qu (*e.g.*), Sequana, the Seine; Equabona, a place in Spain. In modern Celtic the two groups are sharply defined; Welsh, Cornish (now extinct), and Breton are of the *p* group; Gaelic (Scottish and Irish) and Manx are of the *q* group, preserving *qu* as *c* or *ch*. Thus we have Gael. *ech*, Lat. *equus*, 'horse,' as against Gaulish *epo* (in Eponā, etc.), 'horse,' Gael. *cenn*, 'head,' Gaulish *penno*, Welsh *pennu*; Gael. *mac*, 'son,' Welsh *mab*. In modern Celtic the two groups have developed a number of other differences (*e.g.*), Early Celtic *verno*, 'alder,' Gael. *fearna*, Welsh *gïvern*; Early Celtic *dunon*, 'fort,' Gael. *dun*, Welsh *din*. Lastly, in modern Gaelic and Manx the stress in polysyllables regularly falls on the first syllable; in Welsh it falls on the penult.

No Early Celtic literature has been preserved, though there must have been much bardic poetry and historical tales among the early Celts (*e.g.*, Livy's account of the golden age of King Ambigatus implies a saga on this subject). The Druids did not commit their learning to writing; the Bards may have followed their example. Yet by Caesar's time writing was in vogue among the Gauls who had come under the influence of Massilian culture. The Helvetii, when they went on their great migration, kept accurate muster rolls in Gr. characters. After the Roman conquest the Gauls of France took readily to learning (as also to agriculture), and even hired professors at the public expense. Cisalpine Gaul supplied some of the greatest Latin writers: Virgil, Catullus, and Livy bear Celtic names, and were probably Gauls. Seneca is also Celtic. The Celts of Britain after the introduction of Christianity showed the same desire for learning. Ireland from the latter part of the 5th cent. till the end of the 8th cent. was renowned throughout Europe for its scholars. Among the Celtic-speaking peoples of modern times learning has been always admired and desired, nor is this the only way in which they resemble their remote ancestors.

CEMENT. A material used for combining particles in one mass. Leaving on one side the various preparations used for joining glass or porcelain, and for other minor operations, building cements may be divided into three classes—natural cements, Portland cement and plaster of Paris cements. The two most important *natural cements* are Roman and the so-called natural Portland. They are prepared by burning limestone or chalky matter containing a proportion of clay, after which the fused product is ground. They set very rapidly, but lack the strength of

Portland cement. They are chiefly used for repair work in places where strength is of minor importance. *Portland cement* was invented by Joseph Aspdén, of Leeds, England, in 1824. It consists of a mixture of calcium and aluminum silicates and the setting process consists of the combination of these silicates with water, with the formation of hydrated silicates. It is manufactured by mixing together, in proper proportions, either wet or dry, chalk and clay, or similar materials. The mixture is then calcined in a rotary kiln, consisting of a long cast-iron tube lined with fire-brick and slightly inclined to the horizontal. The temperature is sufficiently high to cause the mixture to fuse, a clinker being produced, which must then be ground to a fine powder. In place of the chalk, limestone or marl are sometimes used, while shale or slate may replace the clay. *Plaster cements*, the principal constituent of which is plaster of Paris (partially dehydrated sulphate of lime) are chiefly used for internal work. The best known is Keene's cement, which is manufactured by soaking plaster of Paris in a solution of alum and then re-calcining. The setting of these cements is also a process of hydration, the partially calcined gypsum eagerly absorbing water with the re-formation of hydrated sulphate of calcium in the form of small hard crystals.

CÉNACLE, Fr. name for gathering at the 'Last Supper'; afterwards applied to literary clubs, especially *Romantiques* gathered round Victor Hugo.

CENCI, BEATRICE (1577-99), Ital. parricide; b. Rome. Her *f.*, Francesco C., a man of great wealth and an adjudged criminal from his eleventh year, was murdered while asleep by two assassins hired by his wife, Lucrezia, Beatrice, and several sons. The two women were found guilty, and beheaded. Beatrice's defense was that her *f.* had forcibly committed incest with her, but the charge rests entirely on the unsupported statement of her advocate, Farinaccio, who is known to have made false statements. Beatrice's own life was not free from error, and she made provision in her will for the care of 'a certain poor boy,' said to have been an illegitimate son.

CENIS, MT. (45° 17' N., 7° E.), peak of Alps, between France and Italy; the pass, 6,700 ft. high, is much used; over it a road was constructed by Napoleon. Near M.C. is tunnel of same name; 8 miles long; cost \$15,000,000.

CENOBITES, monks who, like the Benedictines, live a common life in

conventional foundation, as opposed to anchorites (hermits or eremites) who live in solitude.

CENOTAPH ('empty tomb'), commemorative monument or tablet to persons buried elsewhere; originally employed in cases where the bodies of persons could not be recovered, such as death in foreign wars, or by drowning. Cenotaphs were erected to contain the remains of 'the Unknown Soldier' in London, Paris, Rome, Washington, Athens, and other cities in the years following the World War.

CENSOR.—(1) Title of two Rom. officials whose business was to register the citizens and assess their property, and to regulate morals and conduct. (2) An official in the univ's of Oxford and Cambridge who is responsible for the conduct of the non-collegiate students.

CENSORSHIP. (1) *Press.*—In Tudor times the Company of Stationers regulated printing, under control of Star Chamber. Milton in *Areopagitica* protested against Parliament's censorship. It was abolished in 1695. The John Wilkes case, 1764 and 'Junius' prosecution, 1770, confirmed right of press to criticize king and Parliament; and in 1835 pressmen were admitted to parliamentary debates.

(2) *Drama.*—In Elizabethan times the government regulated plays through the master of the revels; in James II.'s reign the lord chamberlain became censor. Censorship was mainly political. In 1642 the theatres were closed by the Puritans. In Charles II.'s reign grossness in plays was general. The modern censorship dates from 1737, when Walpole muzzled Fielding, who in plays criticized politics; the Act of 1737 limited the number of theatres. By the Theatres Act, 1843, a play must be licensed by the lord chamberlain (who appoints examiner of play) before public performance; penalty for breach of Act, \$150 and forfeiture of theatre license. There is no official in the United States, or in any of the States corresponding to the English censor of books and plays. Censorship on books and other printed matter is attained by means of laws which prohibit the circulation of matter of this kind through the mails. Judicial bodies in most of the States are given the power to pass upon the character of books published and plays presented, with power to prohibit the presentation of plays and the circulation of books. The presentation of motion pictures, many of which were deemed unsuitable resulted in the establishment in many States of a Board of Censorship which was given the power to direct changes

to be made in these pictures or to prevent their presentation entirely.

(3) *In War*.—Object, to prevent information of value from reaching the enemy, to obtain information from the indiscretions of the enemy's press and people, and to control enemy's channels of communication. Three classes—(1) telegraph, (2) mails, (3) printed publications. In (1) special attention is paid to messages intended for transmission overseas. During World War trade cables frequently contained military information.

CENSUS, an enumeration of the people of a country, state or district, usually taken with a view of ascertaining not only the number of people, but also age, sex, occupation, color, and other facts connected with individuals. Apart from doubtful claims on the part of the Chinese, it is probable that the earliest recorded instance of a census being taken was that which occurred in the reign of King David when he enumerated the male inhabitants and cattle of the Jewish Kingdom; a proceeding which was regarded as impious and excited great hostility. The opposition felt to such enumeration, not only in ancient but modern times, is due probably to the fact that the census was regarded as an aid to taxation and proscription. The practice was carried on extensively by the Romans, especially with the former end in view. It was instituted also among the Greeks. There was nothing periodic connected with it, sometimes a century or more elapsing between the enumerations. Charlemagne attempted it for his Dominion in mediæval times, and the Domesday Book of William the Conqueror partook of that character. The modern census as a statistical review was instituted in Sweden in 1686, in England in 1801 and in America in 1790.

Since 1790 the United States census has been taken every ten years. At first it was intended chiefly to secure a basis for representation in Congress and for apportionment for direct taxes as required by the constitution. The inquiry was extended to agriculture in 1840 and ten years later to manufacturers. Gradually the scope of the work was extended, until at present it has become an account of the general social and economic condition of the nation. A permanent Census Bureau was organized in 1902 under the Department of Commerce and Labor.

The fourteenth census taken in 1920 was more elaborate and exhaustive than any that have preceded it. It was taken as of Jan. 1, 1920. It covered five general subjects with almost innumerable subdivisions, namely: (1) popula-

tion (2) agriculture, including irrigation and drainage (3) manufactures (4) forestry and forest products, and (5) mines, quarries, gas and oil wells. The cost of the census was over \$20,000,000 and an additional \$3,000,000 was estimated as necessary to carry on investigations for the three years following. More than 87,000 enumerators were employed, in addition to supervisors, clerks and special agents.

The work of the Census Bureau is continuous, lasting through the ten years from one decennial period to another. The mere collection of the facts is only one item in the work. The volume of information is so enormous that it takes periods varying from six months to several years before some of them can be thoroughly analyzed, tabulated, compared and prepared for publication. In the intermediate periods also, special investigations are going on regarding such subjects as wealth, debt, taxation, property valuation, religious bodies, dependent, defective and delinquent classes, mortality statistics and a host of similar questions.

CENT, Amer. coin, value $\frac{1}{100}$ th part of dollar (i.e. $\frac{1}{2}$ d.); it is contraction of Fr. *centime* (Lat. *centesimus*), $\frac{1}{100}$ th part of franc.

CENT JOURS, LES, HUNDRED DAYS, see FRANCE (HISTORY).

CENTAUR (classical myth.), hybrid creature, half horse, half man. Also name of a S. constellation (*Centaurus*); has ten stars brighter than the third magnitude; *Alpha Centauri*, inferior only to Sirius and Canopus in brilliance, is the nearest star (25 billions of miles distant), and is a revolving double star.

CENTENNIAL EXPOSITION, See EXPOSITION.

CENTERING, wooden structure over which a stone arch is built.

CENTERVILLE, a city of Iowa, the county seat of Uppanoos co. It is on the Chicago, Rock Island and Pacific, the Chicago, Burlington and Quincy, and other railroads. The city is the center of an important live stock and agricultural community. In the neighborhood are valuable mines of coal, gypsum, and limestone. Its industries which are important, include railway shops, and manufactures of lumber, mining, flour, etc. Pop. 1920, 8,486.

CENTLIVRE, SUSANNA (d. 1723), Eng. playwright and actress; wife of Joseph C., Queen Anne's cook; author of *The Perjured Husband*, 1700; *Love at a Venture*, 1706; *The Busybody*, *A Bold Stroke for a Wife*, *The Wonder*, and other plays.

CENTRAL AFRICA

CENTRAL AFRICA, BRITISH. See BRITISH CENTRAL AFRICA.

CENTRAL AMERICA, the name given to the geographical division of North America which includes the territory from the Isthmus of Panama to the Isthmus of Tehuantepec. The name is most generally applied, however, to the republics of Guatemala, Honduras, San Salvador, Nicaragua, Costa Rica, Panama and British Honduras. It is bordered by Mexico on the N.W., by Colombia on the S.E., and on either side by the Pacific Ocean and the Caribbean Sea. The total length is about 800 miles, with a breadth varying from between 20 and 30 to 350 miles. The interior is generally mountainous, containing a number of active volcanoes. The greater part of these republics is yet practically undeveloped. The total area is about 220,000 square miles, and the population about 6,000,000. For data relating to each of these republics, see their titles. See also PAN-AMERICAN CONFERENCE, PAN-AMERICAN UNION.

CENTRAL AMERICAN CONFERENCE, a meeting of delegates from the republics of Costa Rica, Guatemala, Honduras, Nicaragua, and Salvador, held in Washington in December, 1922, at the invitation of the United States. The object of the Conference, as set forth by the U.S. Secretary of State, Charles E. Hughes, who presided over its proceedings, was the negotiation of a treaty or treaties to make more effective those provisions of the treaties signed in 1907 which experience has shown to be helpful in maintaining friendly relations and cooperation between the republics; an agreement for the limitation of armaments; and the establishment of tribunals for settling any disputes that could not be adjusted by diplomatic means. The conference had its genesis in a meeting of the presidents of Nicaragua, Honduras and Salvador in August, 1921, on board the American cruiser *Tacoma* at Fonseca Bay, to concert measures looking towards more friendly relations between those countries. An agreement was reached between those presidents acknowledging and reaffirming the general treaty of peace and friendship signed in 1907 by the five Central American republics. Costa Rica and Guatemala declared later that they too regarded the treaty of 1907 as still in force, though it had expired, and expressed their intention to abide by its decisions.

Secretary Hughes explained the purpose of the United States in inviting the republics to confer as being solely inspired by a desire to promote the in-

terests of peace in Central America, and to achieve this end a consideration of the requisites that made for stability and development was necessary. He told the delegates that the American government, in sharing their deliberations had no ambition to gratify at their expense, nor had any policy that ran counter to their national aspirations. The Central American republics had formed a federation in 1920, but it was short lived. At the 1922 conference Honduras and Salvador expressed a desire for a renewal of the federation, but failed to reach an accord with Nicaragua and Guatemala on the proposal.

The outcome of the Conference was a set of fifteen conventions or protocols embracing agreements to establish free trade between four of the republics, Costa Rica excepted; to limit the total military resources of the five republics to 16,500 men, Costa Rica's army being reduced to 2,000, Guatemala's to 5,200 and Nicaragua's to 2,500; to provide for the nonrecognition of revolutionary governments resulting from coup d'etats; to reform electoral procedure; and to establish a new court of justice. This tribunal was designed to continue the functions of the Central American Court of Justice formed in 1907, but was to be differently constituted under the empowering treaty, which provided that its personnel be selected from a panel of judges, fifteen to be named by the United States, and from this panel jurists could be named to pass on any disputes that may arise between the republics. A separate convention was agreed to between the United States and Costa Rica recognizing the latter country's interests in the question of canal rights in the San Juan river.

CENTRAL FALLS, a town in Rhode Island, in Providence co. It is on the New York, New Haven and Hartford Railroad, and on the Blackstone River. It is $4\frac{1}{2}$ miles north of Providence. The city is an important industrial community and has manufactures of cotton, woolen, silk and haircloth goods, and also machinery and leather. The river affords excellent power for industrial purposes. The city has handsome churches and other public buildings. Pop. 1920, 24,174.

CENTRAL INDIA (24° N., 78° E.), political agency, Brit. India; area, 78,774 sq. miles; bounded N. by Rajputana, United Provinces, E. by Chota-Nagpur, S. by Central Provinces, W. by Bombay; comprises about seventy native states, of which Gwalior, Indor, Rewah, Bhopal, and Bundelkhand are most important; large part of surface rugged; drained by

CENTRAL INDIA

CENTRAL PARK

Ken, Nerbudda, Son, and other streams; chief mountains, Vindhya, Kaimur Hills; produces opium, tobacco, rice. Pop. 6,000,000.

CENTRAL PARK, greatest park in Manhattan Borough, of New York City, extending from 59th Street to 110th Street and from 5th Avenue to 8th Avenue. It is over $2\frac{1}{2}$ miles long and more than half a mile wide. It covers 843 acres, of which 400 are in forest while 185 are in lakes and reservoirs. There are 31 miles in walks. Over half a million trees and shrubs add beauty to the park. Work was begun on it in 1857, and over \$30,000,000 have been expended in bringing it to its present condition. It is graced with many statues and monuments, the latter including an Egyptian obelisk, and has botanical and zoological gardens, baseball grounds and tennis courts.

CENTRAL PROVINCES AND BERAR, prov., India ($17^{\circ} 47' - 24^{\circ} 27' N.$, $75^{\circ} 57' - 84^{\circ} 24' E.$); bounded N. by Central India and Chota-Nagpur, E. by Bihar and Orissa, Madras, S. by Haidarabad, W. by Bombay. Surface generally is upland, with two tracts of plain; chief ranges, Satpura, Malkal, drained by Nerbada, Tapti, Mahanadi, Indravati, Wardha, and other streams; climate hot; rainy season, June to Sept.; irrigation supplied by tanks in Central Provinces; Berar has ample rainfall; rice, cotton, millet, wheat, oil-seeds; minerals include coal, manganese; manufactures cottons; chief towns, Nagpur, Jabalpur, Amraoti; administered by chief commissioner, appointed by gov.-gen. Great majority of inhabitants are Hindus; other religions, Islamism, Christianity. Sagar and Nerbada were annexed by British, 1818, and other territories were added later; present prov. formed in 1903 by union of Central Provinces and Berar. Area, 130,991 sq. miles. Pop. 13,913,000.

CENTRAL UNIVERSITY OF KENTUCKY, an institution for men, located at Danville, conducted under the auspices of the Presbyterian Church. It is an amalgamation of two smaller institutions; the Central College of Danville, founded 1822, and the Central University of Richmond, founded 1874, which united in 1901. It has a faculty of 50 instructors, a student body of about 400, and its physical assets are valued at about \$1,500,000. Its library has 30,000 volumes.

CENTRAL WESLEYAN COLLEGE, Methodist educational institution at Warrenton, Mo., organized in 1864. It is co-educational. Its grounds and buildings are valued at \$200,000 and it has a productive endowment of \$250,000. In

CENTRE

1923 it had 372 students and 26 teachers.

CENTRAL WIRELESS STATION. See BROADCASTING.

CENTRALIA, a city of Illinois, in Marion co. It is on the Illinois Central, the Chicago, Burlington and Quincy, and other railroads, 60 miles east of St. Louis, and 252 miles southwest of Chicago. The city is in the orchard section of southern Illinois and is an important distributing point for fruit. There are also large industrial interests including the manufacture of iron, steel, envelopes, knit goods, flour and butter. Here are also the machine shops of the Illinois Central railroad. The city has excellent schools, three banks, and a Carnegie library. It was settled in 1853 and became a city in the following year. Pop. 1920, 12,491.

CENTRALIA, a city of Washington, in Lewis co. It is on several important railroads and is midway between Portland and Seattle. The city is an important industrial community and has manufactures of lumber and canned goods. There are banks, schools and a Carnegie library. A tragedy occurred there on November 11, 1919, which directed the attention of the country to that city. During a parade of World War veterans who were celebrating the first anniversary of the signing of the Armistice, members of the I.W.W. concealed on the roofs of buildings, opened fire on the soldiers and killed several. One of the assailants was killed during the fighting which followed. Another was lynched, and several charged with committing the crime were arrested and found guilty of murder. Pop. 1920, 7,549.

CENTRALIZATION, concentration of power in hands of central government. In the early Middle Ages the king had two objectives, the extension of his rule to the natural boundaries of his kingdom, and the imposition of his authority within those boundaries. The early success of the rulers of Spain, England, and France against the centrifugal tendencies of feudalism secured prosperity which contrasts markedly with the misfortunes which befell disunited Germany and Italy until the XIX. cent. Socialism as set forth in The Great State would mean complete c. within national boundaries.

CENTRE (1) of Gravity. See GRAVITY. (2) of Oscillation, point in a pendulum or oscillating body such that if the whole mass of the pendulum were concentrated there, the time of oscillation would remain unchanged. (3) of Percussion. If a body be free to rotate about a given axis, and if it be struck in

such a way that the blow does not produce pressure on the axis, then the direction of the blow passes through a point in the plane containing the axis and the centre of mass—this is known as the centre of percussion; in respect to any axis it is the same point as the centre of oscillation.

CENTREBOARD, shifting or drop keel used in small boats and racing craft to prevent a boat making leeway by offering great lateral resistance to the water.

CENTRIFUGAL FORCE. See **GRAVITY**.

CENTUMVIRI, Rom. judicial body originally numbering 100 members; retained under the Empire.

CENTURIAN, officer in the Rom. legion; commanded division called *centuria*, originally composed of 100 foot-soldiers; early lost numerical connection.

CENTURIPÉ, formerly Centorbi (37° 35' N., 14° 53' E.), town, Catania, Sicily; Rom. antiquities. Pop. 11,000.

CENTURY, one hundred years. See **CHRONOLOGY**.

CENTURY PLANT, a popular name for the American aloe.

CEORL, member of class in A.S. society between serfs and eorls; the richer c's were named thegns; the landless c. tended to sink into serf class.

CEOS (37° 37' N., 24° 21' E.), island, one of Cyclades, Aegean Sea; modern Zea; belongs to Greece.

CEPHALODISCUS, see under **PTEROBRANCHIA**.

CEPHALONIA (38° 15' N., 20° 35' E.), one of Ionian Islands, Greece; area, 290 sq. miles; surface mountainous; highest peak, Megas Soros; capital, Argostoli; produces currants, olive oil, wine, grain, pulse; belonged to Rom. and Byzantine Empires; to Venice, 1350-1797, subsequently to France, Britain, and finally to Greece, since 1864. Pop. 65,000.

CEPHALOPODA, OR CUTTLE-FISH, the fifth and highest class of the Mollusca, containing well-developed creatures, which in habit, appearance, and also in structure differ greatly from their brother molluscs.

They are free-swimming creatures, bilaterally symmetrical, but in all, except the pearly nautilus the shell, characteristic of most molluscs, is invisible—buried within the body. The most striking feature of Cephalopoda, and that which has received most attention in legendary lore, is the presence

of a ring of 'arms' which surround the head and bear on their surface many strong suckers, or, in the nautilus, tentacles. Stories have been told of the size and strength of the arms of the cuttle-fish, and, indeed, they scarcely exceed the truth; for it has been calculated from captured fragments that, in the neighborhood of Newfoundland, specimens of *Architeuthis* may exceed 50 ft. in total length, and may possess 'arms' 30 to 40 ft. long. Indeed, an Irish specimen has been found with 30-ft. arms, and eyes nearly a foot and a half across.

Cephalopoda are marine animals found in all seas; a few are found near the coast, especially in spring-time at the spawning season, but the majority prefer deeper water, some inhabiting the bottom in almost 2,000 fathoms, while others sail the open sea. They creep with humped back upon the sea-floor by means of their arms, or swim horizontally backwards through the water by use of their funnel, their long arms streaming in 'rear.' Cephalopoda are exceedingly fierce and voracious. They are altogether carnivorous, and feed upon molluscs, crabs, and fishes, which they occasionally follow in schools, sometimes completely ruining local fisheries by reason of their numbers and destructiveness. The sexes are separate, and in spring the females of some species approach the shore and attach their eggs in bunches of seaweeds. Others lay huge globular floating masses of eggs in the open sea.

Cephalopoda are of some, though not of great, value to man. On many of the European coasts they are used as food, the arms of cuttlefish when cooked being alleged to resemble lobster in flavor. From the ink-sac a writing-ink—'sepia'—was obtained, and it is said that this formed the base of China or India ink and other paints. It is interesting to recollect that Cuvier drew his illustration of various cuttles with the 'ink' obtained from the animals themselves. The internal 'bones' of cuttles, again, are powdered, the powder or 'pounce' being used for polishing articles of bone and ivory and as an ingredient of tooth-powder. And lastly, the shells of the pearly nautilus are stripped of their outer layers and become iridescent ornaments of great beauty.

CEPHALUS (classical myth.), s of Thessalian king Hermes; accidentally shot his wife, Procris, and thereupon took his own life by leaping into the sea.

CEPHUS (classical myth.), king of Ethiopia, f. of Andromeda, who was saved from the sea-monster by Perseus. C. is the name less conspicuous N. constellation adjoining Cassiopeia; *Mu Cephei*, a fourth-magnitude star, 'the

garnet star,' probably the reddest star visible in N. hemisphere with unaided eye.

CEPHISSUS (32° 2' N., 23° 44' E.), river, ancient Greece.

CERAM, SERANG (3° S., 130° E.), largest island, Molucca group, Dutch East Indies, W. of New Guinea; traversed E. to W. by mt. chain; numerous streams and forests; exports sago, rice, tobacco, sugar-cane; area, 7,000 sq. miles. Pop. 100,000.

CERAMICS, the study of the art of pottery.

CERBERUS (classical myth.), the triple-headed dog who guarded the door of Hades, permitting all to enter, but none to escape.

CEDRIC (d. 534), Saxon chief, who landed in Hampshire about 495, and, after winning many victories over Britons, became king of W. Saxons, 519.

CEREBELLUM. See BRAIN.

CEREBRUM. See BRAIN.

CERES, Latin name of the goddess of agriculture. (Greek, Demeter); usually represented with ears of corn round her head, poppies in her left hand, and a sceptre in her right. Her dau., Proserpone (Persephone), when gathering flowers in the vale of Enna, was carried off to Hades by Pluto, the god of the under-world. The Cerialia, feast-day of C., was held on April 19 in celebration of fertility of earth.

CERIGNOLA (41° 15' N., 15° 53' E.), town, Foggia, Italy; here the Spaniards defeated French, 1503, establishing Spain's supremacy in Naples. Pop. 38,000.

CERIGOTTO (35° 50' N., 23° 18' E.), small Gk. island, Ionian group; ancient *Aegia*; Gk. *Antikythera*.

CERINTHUS, philosopher who became prominent in the latter years of the Apostle John. He held that Jesus was the natural offspring of Joseph and Mary, and that the world was created by angelic powers, and not by God.

CERIUM (Ce=141.2), metallic element; occurs in Norway with metals Lanthanum and Didymium in rare pink-colored mineral Cerite, a silicate of the three metals; C. is of iron-grey color, malleable; S.G. 5.5.

CERNUSCHI, HENRI (1821-96), Ital. economist; b. Milan; spent most of life in France; specialist on bimetallism; pub. *Mécanisme de l'échange*, 1861; *Le Bimétallisme en Angleterre*, 1879; etc.

CERRO DE PASCO, PASSO (10° 48' S., 76° 12' W.), town, Peru; silver mines. Pop. 6,500.

CERRO GORDO, mountain pass on road between Vera Cruz and Mexico City, where Mexicans defeated by Americans, 1847, under General Scott.

CERTALDO (44° 33' N., 11° 2' E.), town, Florence, Italy; Boccaccio's birth and death-place. Pop. 9,000.

CERTIORARI WRIT OF, issued by Chancery for holding of a new inquisition when finding of first jury is questioned.

CERUMEN, wax of the ear.

CERUSSITE, mineral consisting of lead carbonite; found in Devon, Cornwall, and Cumberland, as right prismatic twin-crystals; transparent or translucent, colorless, yellow, brown, or black.

CERVANTES SAAVEDRA, MIGUEL DE (1547-1616), Span. novelist, dramatist, and poet; b. Alcalá de Henares; s. of Rodrigo de C., an apothecary-surgeon; studied under Juan Lopez de Hoyos, a Madrid prof. of belles-lettres. In 1568 C. entered the service of Cardinal Acquaviva, who had been sent on a mission to Philip II. at Madrid, returning with him to Rome. In 1570 he enlisted as a private soldier, serving under Don John of Austria and other great military leaders. He was severely wounded at the battle of Lepanto, 1571; took part in the naval battle off Navarino, 1572; and was at the capture of Tunis, 1573. In 1575 C. was granted leave to return to Spain, but the fleet in which he sailed was captured off Marseilles, by Algerine pirates. The captives, including C. and his younger bro., Rodrigo, were all disposed of as slaves, C. becoming the property of a Gk. renegade, Dali Maml. C. made many attempts to escape, but it was not until five years had elapsed that his family were able to secure his freedom by ransom.

After his return he devoted several years to further military service, but finally abandoned arms for lit. His first publication was a pastoral romance, *Galatea*, 1585, which apparently did not attract much attention. At this time he was married. He now turned his attention to the stage, and produced between twenty and thirty plays, but without achieving any substantial success. He was made deputy-purveyor to the fleet at Seville, 1587, a post which he exchanged for that of collector of revenues in Granada, 1594. One may assume that he gave more attention to poetry than to accounts, for in 1597 he was cast into

prison at Seville because of a monetary deficiency. He was eventually released upon finding security for the restoration of the money, but was not reinstated. Little is known of the events of his life from this period until 1603, when he is known to have been living at Valladolid, but it is believed that during his imprisonment his world-famous romance, *Don Quixote*, was begun. The first part of this great work was pub. at Madrid, 1605. It was intended as a satire upon the ultra-chivalric romances of the period, and met with instant success. The second part of the book appeared in 1615, and contains the author's most mature work. Had C. never written this masterpiece he would have secured a high place in Span. lit. by virtue of his *Novelas Extemporales*, to name only one phase of his work. Of the immortal *Don* it may safely be said that it is much more widely read at the present time than it was three hundred years ago.

CERVERA, PASCUAL CERVERA Y TOPETE (1839-1909), Span. admiral; commanded a squadron of four ships in the Span.-Amer. War, 1898, which being opposed to a greatly superior force, was destroyed at Santiago de Cuba. He was afterwards tried, but acquitted of blame.

CERVETRI (41° 59' N., 12° 6' E.), ancient city, Italy; has Etruscan rock tombs.

CESAREVICH (more correctly, *Tsesarich*), heir-apparent to Russ. throne.

CESARI, GIUSEPPE (1568-1640), Ital. artist of the 'Idealist' school, who spent many years in the execution of frescoes in the Capitol of Rome.

CESAROTTI, MELCHIORE (1730-1808), Ital. poet, b. Padua; known chiefly as a translator of Homer and Ossian; author of a poem, *Pronea*, addressed to Napoleon; also numerous prose works on Gk. lit., taste, and the poetic art.

CESNOLA, LUIGI PALMA DI (1832-1904), soldier and archaeologist; b. Piedmont, Italy. He was educated at the Italian Royal Military Academy and served in the war of 1849 and later in the Crimea. Coming to the United States a year before the outbreak of the Civil War, he served on the Union side, becoming brigadier general. While serving as U.S. Consul at Cyprus, 1865-77, he made important archaeological discoveries. He was a director and trustee of the Metropolitan Museum of Art, New York, for 26 years. Besides many brochures on archaeological subjects he wrote *Cyprus: Its Cities, Tombs and Temples*.

CESPEDES, PABLO DE (1538-1608), Span. artist and poet; a fine specimen of his work is a *Last Supper* at Cordova, his native place, and other examples are to be found at Saville and Madrid. He also wrote a didactic poem on *The Art of Painting*, which was greatly esteemed.

CÉSPEDES Y MENESES, GONZALO DE (d. 1638), Span. novelist; wrote a *Historia de Felipe IV.*, 1631, and several novels.

CESTIUS, LUCIUS, Gk. rhetorician, who flourished at Rome during the age of Augustus, but who invariably used Latin as the medium of his declamations; examples of his work are to be found in Seneca.

CETACEA, mammalian order, including whales and dolphins. They are characterized chiefly by their fishlike form, essential because of their aquatic habits; the possession of paddle-like fore-limbs (flippers); the absence of external hind-limbs; by a layer of fat (blubber) beneath the skin, and their habit of living together in herds or 'schools.' They chiefly feed on the minute organisms composing the plankton (*q.v.*), and some species on small fish, cephalopoda (*q.v.*); the grampus even attacks seals. The order is generally divided into two suborders, one, the *Mystacoceti*, comprising the whales with baleen (whalebone), such as the humpback (*Megaptera*), the common whale (*q.v.*) (*Balæna*); the other, *Odontoceti*, being represented by toothed genera such as the cachalot or sperm whale (*Pyseter*), the grampus, the dolphin (*q.v.*) (*Delphinus*), the porpoise (*Phocæna*), and the narwhal (*Monodon*). The *Zeuglodontia*, discovered in Eocene strata, have been supposed to show affinities to recent cetacea.

CETEWAYO (d. 1884), Zulu king; s. of King Panda, whom he deposed, 1873; was required by the Brit. Government to disband his strong army and to give promises to live at peace with his neighbors. The promises were not kept, and the government was openly defied, and as a consequence Lord Chelmsford invaded Zululand with 13,000 men Jan. 11, 1879; the disasters of Isandhlwana and Rorke's Drift followed, but the Zulus were signally defeated at Ulundi, July 4. C., who had become a fugitive, was afterwards captured, his kingdom being divided amongst a number of his chiefs. He was eventually restored to part of his kingdom, but, being defeated by his enemies, took refuge in the Native Reserve, where he died.

His son, Dinizulu, attempting to become king, was exiled to St. Helena, 1889, but allowed to return, 1898 in

1907 he was imprisoned on suspicion of being implicated in a Zulu revolt, being sentenced, 1909, to four years' imprisonment. The incident created considerable ill-feeling between the home government and Natal.

CETINA, GUTIERRE DE (1518-72), Span. soldier and poet; saw military service under Charles V. in Italy and Germany, but spent many years of his life in Mexico, where he *d.*; wrote sonnets and other poems in the Ital. manner, under pen-name, Vandalio.

CETTE (43° 23' N., 3° 42' E.), fortified seaport, Hérault, France; has spacious harbor and extensive shipping trade; chief trade is in fish, wine, brandy. Pop. 35,000.

CETTINJE, OR CETTINGE, cap. Montenegro, Jugo-Slavia (42° 24' N., 18° 58' E.); little more than a village; on narrow plateau, alt. 2,000 ft., under shadow of Black Mountain; port Cattaro; captured by Austrians, Jan. 13, 1916, after fall of dominating Mt. Lovtchen. The Montenegrins returned after the armistice, Nov., 1918. Pop. c. 4,500.

CEUTA (35° 54' N., 5° 17' W.), fortified seaport, on small peninsula, N. of Morocco, opposite Gibraltar; military and convict station; castle occupies highest point of a mountain, 636 ft., the ancient Abyla; cathedral; Span. possession since 1508. Pop. 13,000.

CEVA (44° 22' N., 8° 4' E.), town, on Tanaro, Piedmont, Italy.

CÉVENNES (44° 15' N., 3° 44' E.), mountain range, S. France, extending from Canal du Midi, north-eastward to Canal du Centre; divided into N. and S. Cévennes; separate basins of Loire and Garonne from those of Rhône and Saône; highest point, 5,753 ft.

CEYLON, Isl. and Brit. crown colony (since 1802) at S. extremity of India (6°-9° 50' N., 79° 42'-81° 53' E.); consists largely of undulating plains, but S. part is mountainous in interior; extreme length, 270 m.; width, 140 m.; separated from India by Gulf of Manaar and Palk Straits, but closely connected by Adam's Bridge, over which it has been proposed to carry railway. Highest mountains are Pedrotallagalla (8,296 ft.) and Adam's Peak. Ceylon is drained by Mahavilganga, which flows N.E., entering sea near Tricomali. Chief towns are Colombo (cap.), Galle, Tricomali, Kandy. Climate is tropical and healthy except on coast; chief products are tea, copra, rubber, cocoa, cardamoms, timber, graphite. Cingalese in S., many Tamils in N. Area, 25,332 sq. m.; pop. 3,592,400.

CÉZANNE, PAUL (1839-1906), French painter, was *b.* at Aix-en-Provence, France, where he also *d.* The *s.* of a banker, he was never under the necessity of struggling against poverty, although his pictures did not sell during the greater part of his life time. It was Zolo who induced him to go to Paris to study art. He spent the earlier years of his manhood in the French capital, where he came in contact with all the most noted men of his country, but passed his later years, at his home in southern France. He exhibited in 1874 and 1877, and it was discouragement due to the ridicule that the critics heaped on his pictures, that induced him to leave Paris and to retire to the south of France. Here he worked and developed an extraordinarily original style, which has since exercised much influence on the more radical of the younger generation of painters, and today is considered everywhere to be amongst the greatest of creative artists. The story of Cezanne's life is told in Zolo's novel, *L'Ouvreur*.

CEZIMBRA (38° 26' N., 9° 6' W.), town, Estremadura, Portugal. Pop. 6,000.

CHABAS, FRANÇOIS-JOSEPH (1817-82), Fr. Egyptologist.

CHABAZITE, mineral; hydrated silicate of aluminum and calcium (AlSi₃O₈ + CaSiO₃ + CH₂O), occurring in rhombohedral crystals, colorless or brownish-yellow, lining cavities in ancient lava rocks (Giant's Causeway, Faroes).

CHABLAIS (46° 17' N., 6° 35' E.), district, Haute-Savoie, France; produces wine, fruit, cheese.

CHABLIS (47° 50' N., 3° 47' E.), town, Yonne, France; produces famous wine of same name (white Burgundy).

CHABOT, PHILIP DE, COUNT OF CHARNY (*d.* 1543), admiral of France; was held in great favor by Francis I., who made him gov. of Burgundy, and bestowed on him many high offices. His only serious rival for power was Anne de Montmorency, and there was a lifelong conflict between the two. His magnificent tomb is in the Louvre.

CHABRIAS (IV. cent. B.C.), famous Athenian general.

CHABRIER, ALEXIS EMMANUEL (1841-94), Fr. composer. *Gwendoline* was produced at Brussels, 1886, and later at the Grand Opéra, Paris; and *Le Roi malgré lui* at the Opéra Comique, 1887. C. was also the composer of a number of pianoforte pieces.

CHACO (27° S., 61° W.), government, N. Argentina, bordering river Bermejo

and forming part of district, El Gran Chaco; area, 52,741 sq. miles. Pop. 28,000.

CHACONNE, a Span. dance of XVII cent., in slow three-four measure.

CHAD (d. 672), Eng. saint; pupil of St. Aidan; became abbot of Lastingham; later made bp. of Mercia, and fixed his see at Lichfield; famed for his humility and saintly life.

CHAD, LAKE, TSAD (13° 30' N., 14° E.), lake in West Central Africa; area, c. 10,400 sq. miles, varying according to season is wet or dry; 830 ft. above sea-level; N.E. and part of S. shore are in Fr. sphere, part of S. shore in Ger. Kamerun, S.W. shore in Brit. Northern Nigeria; water fresh; fish, turtles, water-fowls, and crocodiles abound.

CHADDERTON (53° 33' N., 2° 9' W.), town, Lancashire, Eng.; cotton manufactures, coal mines. Pop. 30,000.

CHADERTON, LAURENCE (d. 1640), Puritan preacher and educationist; had a distinguished career at Cambridge, and became first Master of Emmanuel Coll.

CHADWICK, SIR EDWIN (1800-90), Eng. social reformer; assisted in drafting Poor Law report, 1834; report on 'Sanitary Condition of the Laboring Population,' 1842; commissioner of Board of Health, 1848-54.

CHADWICK, FRENCH ENSOR (1844-1919), rear admiral U.S.N., was b. at Morgantown, W. Va., and appointed to the U.S. Naval Academy from W. Va., graduating in 1864. He entered the navy as ensign, rising to the grade of rear admiral in 1903. In 1864 he was attached to the Marblehead to pursue the Confederate steamers Florida and Tallahassee. For some time he served in the navy yard in New York, and from 1882-9 was naval attache at the American Embassy in London. During the war with Spain, he was chief of staff of Admiral Sampson, and took part in most of the important Atlantic engagements in this war, winning promotion for conspicuous conduct in battle. He was a member of many historical societies and the author of several works on naval and diplomatic questions.

CHADWICK, GEORGE WHITE-FIELD (1854). Studied in Germany from 1877 to 1880; (Hon. A.M., Yale, 1897; LL.D., Tufts, 1905). Was director of N.E. Conservatory of Music. Composed: *Rip Van Winkle*, *Melpomene*, *Adonis*, *Thalia* and *Euterpe*, overtures, also the opera *Judiith*, various choral works, songs, string quartettes, smaller

orchestral works and three symphonies. In addition to these he composed the ode for the dedication of the Chicago Exposition in 1893.

CHADWICK, JOHN WHITE (1840-1904), writer and Unitarian clergyman, was b. at Marblehead, Mass. His radical sermons attracted much comment, and he contributed extensively to current periodicals. From 1864 until his death he was pastor of the Second Unitarian Church in Brooklyn, N. Y.

CHÆREMON.—(1) Stoic philosopher and grammarian; in 49 A.D. he became one of the tutors to Nero; author of a *History of Egypt*, and treatises on astron., astrology, and grammar. (2) (IV. cent. B.C.) Athenian dramatist, whose *Centaureus* is commented upon by Aristotle.

CHÆRONEIA, ancient city, Bœotia, Greece; remains of theatre and small temple exist; birthplace of Plutarch; famous as site of battle in which Greeks were defeated by Philip of Macedon, 338 B.C.

CHÆTOGNATHA, ARROW-WORMS, class of translucent marine animals attaining a length of up to 2½ in. The body is divided by septa into three divisions, and shows certain affinities to the Annelida. Sagitta and Spadella are two species common in the plankton of the sea.

CHAFFERS (Scarabœidae), a huge family of Lamellicorn beetles, comprising c. of 13,000 species, found all over the globe. Many of the males are armed with horns. They include the Sacred Beetle of the Egyptians (*Scarabæus sacer*), which feeds ingloriously upon dung; and in Britain, the Cockchafer (*Melolontha vulgaris*), the larva of which is exceedingly destructive to crops, and the Rose Chafers (*Cetonia*.)

CHAFFARINAS, ZAFFARINES (35° 10' N., 3° W.), group of small islands, off N. coast Morocco, belonging to Spain.

CHAFFEE, ADNA ROMANZA (1842-1914), American military officer; b. Orwell, Ohio. He enlisted at the outbreak of the Civil War, served with credit and emerged from the struggle with the rank of captain by brevet. For distinguished service at El Caney in the Spanish-American war he was brevetted major general of volunteers. He commanded the American Expedition to China at the time of the Boxer Rebellion, 1900, and in 1902 commanded in the Philippines. In 1905 he became chief of staff of the United States army, retiring from service in the following year.

CHAFFINCH, *Fringilla coelebs*, or 'bachelor finch,' so called because it migrates in flocks of separate sexes; in male bird the head is slate-blue, the back brown, and the breast and throat dullish red; common in Europe and W. Asia.

CHAFIN, EUGENE WILDER (1850-1920), American prohibition advocate; b. East Troy, Wis. He entered the legal profession and practiced law at Waukegan, Wis., 1876-1900. He was admitted to the bar of the U.S. Supreme Court in 1908. He took a keen interest in temperance questions and his eloquence and enthusiasm made him a leader in the prohibition movement. In 1898 he was the candidate of the Prohibition party for governor of Wisconsin, that party nominated him for the Presidency in 1908 and 1912. His publications include *Lives of the Presidents*, 1896; *Lincoln, the Man of Sorrows*, 1908; and *Washington as a Statesman*, 1909.

CHAGNY (46° 56' N., 4° 47' E.), town, France; wines. Pop. 4,700.

CHAGOS (5° S., 72° E.), Brit. group of islets, Ind. Ocean; dependency of Mauritius.

CHAGRES RIVER, flows across Isthmus of Panama; at mouth on N. coast of Isthmus is port of C.

CHAILLU, PAUL BELLONI DU (1835-1903), Fr. traveler and author; made numerous discoveries in zoology, anthropology, and geography in his extensive African travels.

CHAIR, article of domestic furniture. Though of great antiquity, c's now so common, did not even come into general use until about the XVI. cent. Before that period, chests, stools, and benches formed the usual seat of ordinary persons, the c. being more in the nature of a state seat used only by persons of rank. Ancient Egyptian c's were generally of carved and gilded woods, inlaid or decorated with ivory; Rom. c's were frequently of marble; and the c. of Dagobert, preserved in the Louvre, is of bronze. Mediæval c's were usually low, with arm-rests terminating in the heads of beasts or birds, and were without backs. The oldest known Eng. c. is that of Edward I., 1239-1307, at Westminster. It is of oak, and is used in the coronations of Brit. monarchs. Up to the middle of the XVII. cent. the c's of all countries were usually without upholstery, which, when introduced, developed into the gorgeous productions of the XVIII. cent.

CHALCEDON, CALCHEDON (c. 40°

55' N., 29° 5' E.), ancient town, Bithynia, Asia Minor, on Bosphorus, opposite Byzantium. The Council of C. held here in 451 A.D. declared its belief in the duality of the natures united in the one Person of Christ, the doctrine now held by the vast bulk of Christians; and fixed ecclesiastical jurisdiction of Rome and Byzantium.

CHALCEDONY, CALCEDONY (S.O.), variety of native silica, found in translucent masses, with waxy lustre, colored veins, rings, or spots; common examples, pebbles and agates.

CHALCIS (38° 28' N., 23° 27' E.), chief town, island of Eubœa, Greece, on Euripus; flourishing town and colonizing center in ancient times; belonged successively to Athenians, Macedonians, Romans, and Turks. Pop. 11,000.

CHALDÆA (c. 35° N., 45° E.), ancient country, between Tigris and Euphrates rivers, Asiatic Turkey; an immense plain of extremely fertile soil; produces wheat, barley; has palm forests; abode of civilized races for many cent's; empire dated from remote antiquity; destroyed c. 2,300 B.C.

CHALDEE, language in which some portions of the Books of *Daniel* and *Ezra* were written, said to have been the vernacular language of Babylon.

CHALDRON, coal or coke measure, generally about 36 bushels in England.

CHALFONT ST. GILES (51° 38' N., 0° 34' W.), village, Buckinghamshire, England; here Milton wrote part of *Paradise Lost*.

CHALGROVE (51° 41' N., 1° 6' W.), village, Oxford, England; here Royalists defeated Roundheads, 1643; Hampden killed.

CHALIAPIN, FEODOR (1873), a Russian operatic singer, b. in Kazan. He sang for many years in Russia and appeared at the Drury Lane Theatre, in London, in 1913. He afterwards sang at the Metropolitan Opera House in New York, and made a successful tour of the United States in 1923. He was generally considered to be one of the greatest artists of his time.

CHALICE, primarily the eucharistic wine-cup; but also name for an ordinary goblet.

CHALK, a soft, pure white limestone composed of shells of microscopic marine animals, mostly *Foraminifera*, and rich in fossils (corals, sponges, mollusca); geologically forms distinguishing feature of the Upper Cretaceous formation, being represented in England by the N. and

S. Downs, York and Lincoln Wolds, Salisbury plain, Chiltern Hills; used for writing, preparation of lime, Rom. cement, putty.

CHALKHILL, JOHN, Eng. poet, of whose life nothing is known. Two songs, stated to be by him, are quoted in Walton's *Compleat Angler*; and a long poem, *Thealma and Clearchus*, bearing his name as author, appeared in 1683.

CHALLEMEL - LACOUR, PAUL AMEND (1827-96), Fr. philosophical writer and statesman.

'CHALLENGER' EXPEDITION, scientific expedition, 1872, fitted out by Brit. government for investigation of fauna and flora of deep sea. Its results fill 50 vol's.

CHALLONER, RICHARD (1691-1781), Eng. R.C. bp.; ed. Douai; bp. of Hammersmith, 1741; later Vicar-Apostolic of London district; pub. *Catholic Christian Instructed*, 1737; *Memoirs of Missionary Priests*, 1741; *Britannia Sancta*, *Garden of the Soul*, etc.

CHALMERS, ALEXANDER (1759-1834), Scot. writer and edit.; *Biographical Dictionary* still used.

CHALMERS, GEORGE (1742-1825), Scot. antiquarian; b. Fochabers (Elgin); visited America, 1763, and settled in Maryland as lawyer, but returned to Scotland on the outbreak of the War of Independence. He wrote numerous antiquarian and political works, also several biographies, but is chiefly remembered for his contribution to Scot. history, *Caledonia*, of which, however, only three vol's appeared ere his death.

CHALMERS, GEORGE PAUL (1833-78), Scot. landscape painter of heavy Romantic school.

CHALMERS, HUGH (1873). Was educated at public schools and later attended business college. He began as an office boy with the National Cash Register Co., of Dayton, Ohio, and in 1900 was made Vice-President and General Manager of that company. In 1907 he was elected President of the E. R. Thomas Detroit Motor Co., and continued as President for its successors, the Chalmers-Detroit Motor Co. and the Chalmers Motor Co. He was later director of the latter company and also President of the Chalkis Manufacturing Co., who manufactured anti-aircraft guns, and director of the Fairview Foundry Co., of Detroit.

CHALMERS, STEPHEN (1880). Received a grammar school education at Dunoon, Scotland. Went to the West Indies in 1898. Traveled exten-

sively in that country and also in South America. Was sub-editor of the Daily Gleaner at Kingston from 1901 to 1902, when he moved to New York and from then until 1907 was connected with various newspapers in New York City. He was the author of *The Vanishing Smuggler*, 1909; *When Love Calls Men to Arms*, 1910; *The Trail of the Tenderfoot and A Prince of Romance*, 1911; *Footloose and Free*, 1912; *The Beloved Physician—Edward Livingston Trudeau*, 1915; *The Penny Piper of Saranac*, 1916; *Enchanted Cigarettes*, 1917; and *The Greater Punishment*, in 1920.

CHALMERS, THOMAS CLARK (1868). Graduated from Bellview Hospital Medical College in 1897. Pediatricist Cornell U. Dispensary, 1903-7; attending pediatricist, Jamaica Hospital, 1913-16; attending physician and pediatricist Flushing Hospital, 1915; attending physician at Queensboro Hospital, 1915 and president of the medical board of the latter institution from 1915-1921. Was 2nd Lt. President's Troop, Washington, D. C., 1889-90; capt. asst. surgeon of the 12th Regiment, N.G.N.Y., 1897-8; maj. surgeon 12th N.Y. Volunteers, 1898-9, and maj. surgeon U.S. Volunteers from 1899 to 1903. Saw service at Chicomangua, in Cuba and in the Philippines. Served as physician on Draft Boards in New York City during the World War, 1917-18.

CHALONER, SIR THOMAS (1521-65), Eng. state official; held various court appointments under the Protector Somerset and Queen Mary, and acted as ambassador for Queen Elizabeth on several occasions. He was the intimate friend of Burghley, and employed his leisure in the compositions of pastorals and Latin verses, which were held in some repute.

CHALONNES-SUR-LOIRE (47° 21' N., 0° 46' W.), town, France. Pop. 4,500.

CHALONS-SUR-MARNE (anc. *Catalaunum*), chief town, dep. Marne, France (48° 57' N., 4° 20' E.), about 100 m. E. of Paris and 25 m. S.S.E. of Reims, on r. bk. of the canalized Marne; narrow streets, fine boulevards, and park of 19 ac.; see of bishop; 13th to 17th cent. cathedral, with remarkable stained-glass windows and one of the finest altar-pieces in the country; fine library, museum, school of arts and trades; great trade in champagne, grain, and hemp; on surrounding plain Attila and his Huns were defeated 451; captured by Germans, 1814; large military camp established in 1870, from which MacMahon marched to disaster at Sedan. In World War, Germans entered town during advance

towards Paris, Sept. 6, 1914, but abandoned it in course of their retreat five days later, having thoroughly previously looted it, and imposed indemnity of \$6,000,000 for dep., of which \$100,000 was paid for Châlons. Subsequently frequently bombed by enemy airmen. Pop. 31,300.

CHALON-SUR-SAÔNE (46° 47' N., 4° 52' E.); Saône-et-Loire, France; manufacturing and commercial town; ancient *Cabillonum*; cathedral is of XIV. cent.; has copper and iron foundries. Pop. 31,550.

CHALUKYA, Ind. dynasty, founded by Pulakesin I., which *fl.* in the Deccan 550-750 A.D., and again 973-1190.

CHALYBITE (FeCO₃), mineral consisting of iron carbonate; a common iron ore, yellowish-brown rhombohedral crystals found in Devonshire, Cornwall, Cumberland.

CHAMÆROPS, a genus of palm-trees, consists of only two species, both Mediterranean plants, and *C. humilis* having the peculiarity of being the only European palm. It is frequently cultivated in hothouses, where it grows to a height of 15 ft., but in Spain it grows in the open to about 4 or 5 ft. only, and in Italy it is smaller still.

CHAMBA (32° 29' N., 76° 10' E.), native hill state, Punjab, India; traversed by Ravi and Chenab Rivers; chief industries, agriculture and grazing; copper, iron, and slate plentiful; capital, Chamba; area, 3,216. [Pop. 135,000.

CHAMBAL (c. 24° N., 75° 26' E.), tributary of Jumna River, Central India; rises in Vindhya Mts.

CHAMBER OF COMMERCE OF THE UNITED STATES, an organization of business men constituted at Washington, D.C., on April 23, 1912, at a national conference called by the President of the United States. Its expressed purpose is 'to nationalize the foreign and domestic commerce of the United States by co-operative effort among commercial organizations.' It gathers and disseminates commercial information; influences legislation by representation and argument; acts on occasion as a medium of arbitration; fosters commercial and technical education. It publishes monthly *The Nation's Business* and issues general legislative bulletins for the information of its members. Its membership in 1923 was 16,000.

CHAMBERLAIN, official appointed by a sovereign or corporation to under-

take performance of ceremonial duties. The Lord Chamberlain is a court official whose institution dates back to the XIV. cent., or earlier. He has control, assisted by the *Vice-C.*, over a great number of the court servants, the royal wardrobe, selects tradesmen, etc., issues invitations to state functions, and is the licenser of theaters and plays. The Lord Great C. is an hereditary household magnate, the old *camerarius regis*, whose office is now held jointly by the Marquess of Cholmondeley and the Earls of Ancaster and Carrington; he has a station in the palace, control of ceremonies, care of sword of state, etc.

CHAMBERLAIN, ARTHUR HENRY (1870), an educator, born at Oak Lawn, Ill., s. of James Adams and Sarah Elma Chamberlain. He was educated at Throop Polytechnic Institute, Pasadena, Cal., and received diplomas from Leipzig, Germany and Naas, Sweden. He became principal of the Cook County Normal School in 1900 and later held various positions in the Throop Poly. Inst. From 1907-10 he was treasurer and director of the executive committee of the University of California. Author of: *Educative Hand Work Manuals* in two volumes, 1901-5; *The Conditions and Tendencies of Technical Education in Germany*, 1908; *Ideals and Democracy*, 1913, and also contributed to magazines and was a lecturer on technical and educational subjects.

CHAMBERLAIN, BASIL HALL (1850), English scholar and authority on Japan, was born at Southsea, Eng. He is Emeritus professor of philology at the Imperial University of Tokio and has published various works on Japanese poetry and on the Japanese language.

CHAMBERLAIN, GEORGE AGNEW (1879), graduated from Lawrenceville School at Lawrenceville, N.J. in 1898 and took a special course at Princeton University in English Literature and the Romance Languages. He was appointed deputy consul-gen. Rio de Janeiro, Brazil in April 1904 and vice and deputy consul-gen. in June, retired in December of the same year. Was consul at Pernambuco, Brazil from 1906-9; at Lour-ençe Marquez, 1909-14; and was made consul gen. at Mexico City, Mexico, May 12, 1917 which position he resigned Aug. 1919. Author: *Home*, 1914; *Through Stained Glass*, 1915; *John Begardus*, 1916; *White Man*, 1919 and *Not All King's Horses* the same year; *Pigs to Market*, 1920; and *Is Mexico Worth Saving?* and *Cobweb* in 1921. Also wrote short stories and contributed to various magazines on social and economical subjects pertaining to South America.

CHAMBERLAIN, GEORGE EARLE (1854), senator, was born near Natchez, Miss. and educated at Washington and Lee University. In 1876 he went to Oregon and a few years later became a member of the Oregon House of Representatives. After serving as district attorney and attorney general, he was elected governor for terms, 1903-7 and 1907-11. He was elected U.S. senator for term 1909-15 and reelected for term 1915-21. He is responsible for the Chamberlain Military preparedness bill of 1918.

CHAMBERLAIN, JOHN LOOMIS (1858), army officer, was born in New York and educated at Genesee State Normal School, and later at the U.S. Military Academy. He has held various posts in the army and in 1912 took part in the campaign against the Sioux Indians. For a year he was instructor of military science and tactics at Peekskill Military Academy, the following year, 1897, becoming military attache at the United States Embassy in Vienna. He was promoted to the rank of major-general in 1917.

CHAMBERLAIN, JOSEPH (1836-1914), Brit. statesman; b. London; eldest s. of Joseph Chamberlain, master of the Cordwainers Co.; educated at Canonbury, and Univ. Coll. School, London; joined his cousin, Joseph Nettlefold, in a screw-making business; retired, 1874, and devoted his energies to political work. He married thrice; unsuccessful as advanced Radical candidate for Sheffield, 1874; mayor of Birmingham, 1873-6. In 1895 he became colonial secretary in Lord Salisbury's cabinet. He conducted negotiations with the S. African republics previous to the war of 1899-1902. When Mr. A. J. Balfour succeeded Lord Salisbury as premier, July 1902, Chamberlain became colonial secretary, but withdrew, 1903. He was instrumental in founding Birmingham Univ. 1900, and became its first chancellor.

CHAMBERLAIN, (JOSEPH) AUSTEN (1863), English statesman, eldest son of Joseph Chamberlain; M.P. for E. Worcestershire, 1892-1914, and W. Birmingham since 1914; was member of war cabinet, 1918; again chancellor of Exchequer, 1919-1921.

CHAMBERLAIN, JOSEPH EDGAR (1851), was educated in Wisconsin. From 1871 to 1901 was on staffs of various leading newspapers, including war correspondent for the New York Evening Post in Cuba, 1898. Was literary editor, editorial writer and art critic of the New York Evening Mail from 1901 to 1915

when he became associated with the Boston Transcript as editorial writer. In addition to his contributions to magazines, he wrote *The Listener in the Town* and *The Listener in the Country* in 1896; *Life of John Brown* (in Beacon Biographies), 1899 and *The Life of History* in 1907.

CHAMBERLAIN, JOSHUA LAWRENCE (1828-1914), American military officer and educator; b. Brewer, Me. He graduated from Bowdoin College in 1852 and from Bangor Theological Seminary in 1855. The following year he became professor of rhetoric and oratory at Bowdoin. Entering the army in 1862 as lieutenant colonel of volunteers, he served with great distinction in the Army of the Potomac, winning the Congressional Medal of Honor for gallant work in the battle of Gettysburg and being made brigadier general on the field by Gen. Grant in 1864 for his leadership of a desperate charge. He was brevetted major general in the Spring of 1865. Returning to civil life, he was elected Governor of Maine in 1866 and served four terms in that office. He was chosen president of Bowdoin College in 1871 and held that position till 1883. His publications include *Ethics and Politics of the Spanish War*, 1898; *Property: Its Office and Sanction*, 1900; and *Ruling Powers in History*, 1905.

CHAMBERLAIN, SIR NEVILLE BOWLES (1820-1902), Eng. field-marshal; s. of Sir Henry Chamberlain, Bart.; served in first Afghan War, 1839-42, Gwalior campaign, 1843, Punjab campaign, 1848-49, distinguished himself at siege of Delhi, where he was wounded.

CHAMBERLAYNE, WILLIAM (1619-79), Eng. poet; physician by profession; fought on Royalist side during Civil War; pub. *Pharonnida*, narrative poem in 5 books, 1659, an important work in history of prosody, containing many poetical gems, but bad in construction; *Love's Victory*, tragi-comedy, 1658; *England's Jubilee*, 1660.

CHAMBERLIN, THOMAS CHROWDER (1843). Graduated at Beloit College in 1866. Given LL.D. degree by University of Wisconsin, Beloit College, Columbia University, University of Michigan, and Toronto University. Professor of geology at Beloit, 1873-1882, at Columbian University in 1885. Became president of University of Wisconsin in 1887. Professor and head of department of geology, University of Chicago, from 1892 to 1919, since then professor emeritus. Author of *Geology of Wisconsin*; *General Treatise on Geology* (with R. D. Salisbury); *The Origin of*

CHAMBERS

the Earth, 1916. Editor of the Journal of Geology.

CHAMBERS, (CHARLES) HADDON (1860-1921), British playwright, was b. at Stanmore, near Sydney, Australia, of Irish parents. When 15 years of age he entered the New South Wales civil service, later becoming a stock rider in the Australian bush. He first visited England in 1880 and two years later established himself as a journalist and story writer and finally as a playwright. He was the author of the extremely successful plays, *Captain Swift* and *The Tyranny of Tears*.

CHAMBERS, EPHRAIM (c. 1680-1740), Eng. encyclopedist; b. Kendal; apprenticed to a London globe-maker; later devoted his whole time to the production of his *Dictionary of Arts and Sciences*, pub. 2 vol's, 1728. A Fr. trans. inspired Diderot and D'Alembert to produce their *Encyclopedie*, and C.'s work was not without influence on Dr. Samuel Johnson.

CHAMBERS, ROBERT WILLIAM (1865), author and artist, was born at Brooklyn. He studied art in the Julien Academy in Paris and first exhibited in the Salon of 1889. He has been an illustrator for Life, Vogue, Truth, etc. and is the writer of a remarkably long list of novels, most of which have had large sales, and which have given him a wide reputation of the more popular kind. He is also the author of a drama, *The Witch of Ellangowan*, which was written for the late Miss Ada Rehan and produced at Daly's Theatre, New York, and of a musical comedy, *Iole*, produced in New York in 1913.

CHAMBERSBURG, a borough of Pennsylvania, in Franklin co., of which it is the county seat. It is on Conococheague and Falling Creeks and on the Cumberland Valley and Western Maryland railroads, 52 miles southwest of Harrisburg. It is the seat of Wilson College and has several other educational institutions. It has important industries and machine shops. Pop. 1920, 13,171.

CHAMBERTIN, red wines obtained from Gevrey-C., France.

CHAMBERY (45° 34' N., 5° 54' E.), town, France, capital of former Duchy of Savoy (q.v.); cathedral, seat of abp.; manufactures silk-gauze, etc. Pop. 16,000.

CHAMBORD (47° 38' N., 1° 33' E.), famous château Loir-et-Cher, France; begun by Francis I.; served as royal residence.

CHAMOIS

CHAMBORD, HENRI CHARLES FERDINAND, COMTE DE (1820-83), Fr. Royalist; s. of Duc de Berry; grandson of Charles X.; b. seven months after his f.'s assassination; claimed Fr. crown and title of Henry V.; m. Archduchess Maria Theresa, but had no issue, and thus the Comte de Paris, representing the Orleans branch of the Bourbons, became heir to his claims.

CHAMBRE ARDENTE (Fr.: 'the fiery chamber'), inquisitorial court established in France by Francis I. (1535) for trial of heretics, and abolished in 1682. Its work was similar to that of the Holy Office in Spain, and the chamber was particularly active during the reign of Henry II.

CHAMELEON, or **CHAMÆLEON**, a genus of lizards characterized by the peculiar structure of its skeleton and skull, the soft small-scaled skin with power of changing color, circular eyelids, long, slender tongue which it protrudes exceedingly quick to catch insects, prehensile tail, digits adapted for grasping the branches of trees in which the chameleon lives. Common chameleon (*C. vulgaris*) occurs in N. Africa, Syria, and Asia Minor.

CHAMFORT, SEBASTIAN ROCH NICOLAS (1741-94), Fr. author; natural s. of a grocer named Nicolas; b. Clermont (Auvergne); took active part in the Revolution, and was involved in numerous troubles by his bitter speeches; is chiefly remembered by his *Maximes et Pensees*, which have been favorably compared with those of La Rochefoucauld.

CHAMISSO, ADELBERT VON (1781-1838), Ger. poet and botanist; pub. *Frauen Liebe und Leben*, 1830, lyrical poems, set to music by Schumann; *Peter Schlemihl*, 1813, a weird tale (trans. into Eng. by W. Howitt), and numerous botanical treatises.

CHAMLEE, MARIO (1892), after graduating from high school he entered the University of California and later received vocal training under Achille Alberti at Los Angeles and studied repertoire with Richardo Deller at New York. For several years he appeared with small opera companies and in 1920 made his debut at the Metropolitan Opera House, New York City, as Cavaradossi in *La Tosca* with Scotti and Farrar. Made notable successes while touring with the Scotti Opera Company in *Lucia*; *Rigoletto*; *Butterfly* and *L'Oracolo*. Served with the 77th Division N.Y., in France from 1917 to 1919.

CHAMOIS, *Rupicapra tragus* (Ger.).

CHAMOMILE

Gemsa), a goatlike type of antelope (*q.v.*), with small horns, inhabiting the Pyrenees, Alps, Carpathians, Caucasus, and the mountains of W. Asia. They occur in herds of up to twenty, and display remarkable agility and keenness of scent and sight. The leather made from their skin was the original *shammy* leather.

CHAMOMILE, CAMOMILE, medicinal herb (*Anthemis nobilis*); dried flowers made into 'c. tea' possess excellent tonic and stomachic properties.

CHAMONIX, CAMOUNI (45° 56' N., 6° 51' E.), mountain valley and village, Haute-Savoie, France, at foot of Mont Blanc; glaciers; tourist resort.

CHAMP DE MAI, Frankish national meeting place for political purposes under Carolingian kings. Under the Merovingians this was the *Champ de Mars*.

CHAMPAGNE, PHILIPPE DE, CHAMPAIGNE (1602-74), Fr. painter of valued portraits.

CHAMPAGNEY (47° 44' N., 6° 41' E.), town, Haute-Saône, France. Pop. 4,100.

CHAMPAGNY, JEAN BAPTISTE NOMPÈRE DE (1756-1834), Fr. diplomatist, statesman, and historian; Minister of Foreign Affairs, 1807; favored restoration of Bourbons.

CHAMPAIGN, a city of Illinois, in Champaign co. It is on the Illinois Central, the Cleveland, Cincinnati, Chicago and St. Louis, and other railroads, 48 miles S.E. of Bloomington. The city is the center of a rich agricultural region and is the distributing point for agricultural products. Here are the Burnham Athenaeum and a hospital. Pop. 1920, 15,873.

CHAMPARAN, CHUMPARUN (26° 50' N., 84° 30' E.), district, Tirhut division, Bihar and Orissa, India; area, 3,531 sq. miles. Pop. 1,800,000.

CHAMPAUBERT (46° 53' N., 3° 47' E.), district, France, where Napoleon defeated Prussians and Russians, 1814.

CHAMPERICO (14° 25' N., 91° 40' W.), port, Guatemala; railway terminus.

CHAMPERTY, legal term for illegal collusion by which one person agrees to pay costs of lawsuit in which he is not a litigant on condition of dividing the profits.

CHAMPFLEURY, pseudonym of Jules Fleury-Husson (1821-89), Fr. novelist and art critic; wrote valuable *Bibliographie ceramique*.

CHAMPIGNY, commune of the Seine;

CHANCEL

scene of battles between French and Prussians, 1870.

CHAMPION, one who represents or contends in the cause of another. Thus in the Middle Ages a priest, a woman, or an old or otherwise enfeebled person could nominate a 'champion' as their representative in any quarrel or passage of arms. The 'King's Champion' was an officer who, after a coronation in England, summoned to single combat any person who dared dispute the sovereign's title to the throne. The office was of very early origin, and continued until after the coronation of George IV.

CHAMPION HILLS, a locality in Mississippi, in Hinds co., near Vicksburg, where a battle took place May 16, 1863, between the Union forces under General Grant and a Confederate army under General Pemberton. The Confederate army was defeated and suffered a large loss of men and guns. It retreated to the Big Black River.

CHAMPIONNET, JEAN ÉTIENNE (1762-1800), distinguished Fr. general of the Revolution.

CHAMPLAIN (44° 30' N., 73° 25' W.), lake between states of New York and Vermont; area, 500 sq. miles; numerous affluents; contains about fifty islands; drains N. by Richelieu River into St. Lawrence; communicated with Hudson River by C. Canal; scene of two naval battles between British and Americans, 1776 and 1814.

CHAMPLAIN, SAMUEL DE (1567-1635), Fr. colonial agent and writer of travels; sent on exploring expedition up St. Lawrence, 1603; made settlement at Port Royal, 1604, but was forced to retire; established first European colony at Quebec, 1608; discovered Lake 'Champlain,' and started Fr. conflict with 'Five Nations' of Indians; made trading settlement, 1611, at Mont Royal (Montreal).

CHAMPLEVÉ, surface in which hollows are made to receive enamels; hence applied to enamel work.

CHAMPOLLION, JEAN FRANÇOIS (1790-1832), and his bro., Jacques Joseph C.-Figeac (1778-1867), Fr. archaeologists; the former a pioneer in study of Egyptian hieroglyphics.

CHAMPS ELYSÉES, Parisian thoroughfare, from the Arc de Triomphe to the Place de la Concorde; formed from the open country in XVIII. and XIX. cent's; now promenade of rank and fashion.

CHANCEL, eastern portion of church building, occupied by the altar, accom-

modating the choir and clergy. It is often separated from the nave by a carved wood or wrought-iron chancel-screen.

CHANCELLOR, title in England of head of legal profession. The name *cancellarius* was given by Romans to official who in law courts sat at 'chancel' or screen separating public from judge and counsel; in Byzantine Empire notaries were called *cancellarii*; title retained by barbarian states who imbibed Roman law, and given to subordinate legal officials, over whom was *archi-cancellarius*, the Keeper of the Royal Seal, who developed in England into the *Lord High C.* The name has been since applied to keepers of seals of many organizations; title lost in most European countries, and applied in Germany to chief political (not legal) official. In England the office existed from Saxon times, and became next in importance to justiciars in time of Henry II.; equitable jurisdiction dates from 1280, when petitions to king were referred to chancellor; in reign of Edward III. he ceased to follow the court, and petitions were directed to him straight; later, keepership of Great Seal sometimes separated from chancellorship. For office of *Lord C. of Scotland*, that of Keeper of Great Seal was substituted at the Union, 1707.

CHANCELLOR, RICHARD (d. 1556), Eng. explorer in Russia, Archangel, etc.

CHANCELLORSVILLE, BATTLE OF, name given to an action fought May 1-4, 1863 at Chancellorsville, Marye's Heights and Salem Church, Va., between the Union forces under General Hooker and the Confederates under General Lee, in which the former were disastrously defeated. Lee had about 60,000 men while Hooker had 120,000. A flanking movement on the first day by the Union forces under Reynolds, Slocum, Sedgwick and Sickles met with some measure of success, but the main attack that was to have been delivered against Lee's left wing failed. On the second day Stonewall Jackson drove in the Union right under Howard, while Lee held Meade in check. On the third day Lee attacked and defeated Hooker, compelling the Union forces to retire beyond the Rappahannock. The Union loss in killed, wounded and missing was 17,197; that of the Confederates, 13,019.

CHANCE-MEDLEY, legal term for offence which is partly matter of chance; does not include crimes of passion.

CHANDA (19° 56' N., 79° 20' E.), town, Nagpur division, Central Prov-

inces, India; cotton, silk. Pop. 16,000.

CHANDAUSI (28° 27' N., 78° 49' E.), town, Moradabad district, United Provinces, India; cotton. Pop. 28,000.

CHANDERI (c. 24° 43' N., 78° 8' E.), town, Central India; formerly fortified. Pop. 4,100.

CHANDERNAGORE, CHANDARNAGAR (22° 52' N., 88° 25' E.), town on Hugli, Bengal, India; Fr. possession and settlement; manufactures cotton cloth; taken by Brit., 1757 and 1816; finally restored to France, 1816. Pop. 24,500.

CHANDLER, RICHARD (1738-1810), Eng. antiquary; pub. large work on *Ionian Antiquities*, 1769, *Life of Bishop Waynflet* (period of Henry VI.), *Travels in Greece, History of Ilium*, etc.

CHANDLER, SAMUEL (1693-1766), Eng. Non-conformist preacher; was a Presbyterian, and famed for his learning; for about forty years conducted a meeting-house in Old Jewry; pub. *Vindication of the Christian Religion*, 1725; *Reflections on the Conduct of Modern Deists*, 1727; *Vindication of the Old Testament*, 1740, and other controversial works.

CHANDOR (20° 19' N., 74° 17' E.), town, Bombay, India; captured by British, 1804, 1818. Pop. 5,500.

CHANDOS, title of an Eng. barony held by the Brydges family, 1554-1719; in the latter year it was raised to a dukedom, and so continued until 1789, when it became extinct. It was revived and added to the dukedom of Buckingham in 1822, with which it became extinct, March 26, 1889.

CHANDOS, SIR JOHN (d. 1369), Eng. military commander; fought at *Cambray*, 1337; *Crecy*, 1346; *Poitiers*, 1356, where he saved life of the Black Prince. He won the victories of *Auray*, 1364, and *Navaret*, 1367. He was held in great estimation by Edward III., who made him a Knight of the Garter, and Seneschal of Poitou. He was killed at *Lussac*.

CHANDPUR (29° 10' N., 78° 19' E.), town, United Provinces, India. Also name of several places in Bengal. Pop. 13,000.

CHANDRAGUPTA MAURYA, SANDROCOTTUS (c. 321-296 B.C.), Ind. king; conquered the Punjab and other districts, and made himself paramount throughout India.

CHANGARNIER, NICOLAS ANNE THÉODULE (1793-1877), Fr. general and politician; distinguished in Algeria

and in the Franco-Prussian War.

CHANG CHIH-TUNG (1837-1909), Chin. statesman and scholar; intensely patriotic, an enthusiast and a dreamer, but quite impractical; unrivalled in his knowledge of the Chin. classics; his *China's Only Hope* had great influence on the 1898 Reform movement, and produced complete revolution in Chin. education; viceroy of Hu-kuang, 1889-1907.

CHANG-CHOW (24° 28' N., 117° 42' E.), walled city, province of Fu-Kien, China; silk. Pop. 500,000.

CHANG-CHOW (31° 52' N., 119° 47' E.), town, Kiang-Su, China. Pop. 360,000.

CHANGRA, KANGHARI (40° 35' N., 33° 40' E.), town, Kastamuni vilayet, Asia Minor; ancient *Gangra*; fruit. Pop. 7,000.

CHANG-SHA (28° 22' N., 112° 50' E.), town, Hunan, China; site of Yolo Coll. Pop. 300,000.

CHANNEL ISLANDS, or **ISLES NORMANDES**, Brit. islands in Eng. Channel (49° 20' N., 2° 20' W.), off coast of Normandy; largest are Jersey, Guernsey, Alderney, Sark, Herm; produce large quantities of fruit, flowers, and vegetables, exported to England; important cod, lobster, and oyster fisheries; famous for special kind of cattle, each island having its particular strain; climate mild. The islands are a favorite summer resort of Fr. and Eng. tourists, and are surrounded by reefs on which many shipwrecks have taken place. Jersey and Guernsey (the latter including Alderney and Sark) are each administered according to their own laws by a military lieutenant-governor and a bailiff (who presides over the parliament or 'states'), appointed by the crown. Alderney has a parliament, and both Alderney and Sark have courts of justice subordinate to Guernsey. Jersey and Guernsey have local copper coinage. Taxes and customs duties are very low.

History.—Channel Islands are said to have been inhabited successively by Celts, Romans, Saxons, Goths, and Franks in early times; granted to Dukes of Normandy in 10th cent.; united with Eng. crown since Norman Conquest; frequently invaded by French (notably in 1461 and 1781), who, however, failed to subjugate them.

Inhabitants are of Norman stock; official language is French, though English is taught in schools; the country people speak a Norman-French dialect. Religion, Protestantism. Militia service is compulsory. Area, 75 sq. m.; pop. 96,900.

CHANNEL TUNNEL, a proposed tunnel under the Straits of Dover to improve railway communication between England and France; first scheme interrupted by Franco-Prussian War, 1870; trial tunnels from Sangatte and Dover driven in 1875 proved successful; joint select committee of Lords and Commons 1883, reported the scheme 'inexpedient,' and operations ceased on both sides; the question was considered by War Office and Admiralty in 1921-2.

CHANNING, EDWARD (1856), graduated from Harvard in 1878, A.M. and Ph.D. 1880, and was a professor of history at that University from 1883. Author of *Town and County Government in the English Colonies of North America*, 1884; *The Narragansett Planters*, 1886; *The Navigation Laws*, 1890; *Student's History of the United States*, 1898; *First Lessons in United States History*, 1903; *History of the United States* in five volumes, 1905-21.

CHANNING, JOHN PARK (1863), a mining engineer, born at New York, s. of Roscoe H. and Susan Thompson Channing. He graduated from Columbia University in 1883 and was engineer and superintendent of the iron and copper mines in the Lake Superior district from 1885-1894. He was manager of Calumet and Hecla Mining Co. in 1893 and was connected with many other mining and developing companies including the General Development Co. and the Miami Copper Co. both of which he was vice-president. He was the author of numerous technical articles for mining societies and engineering and scientific magazines and delivered a course of lectures on mine plant at Columbia.

CHANNING, WILLIAM ELLERY (1780-1842), Amer. preacher and author; b. Newport, Rhode I.; graduated at Harvard, and became a tutor in Virginia; was app. (1803) pastor of the Federal St. Congregational Church, Boston, a position he held till death. He was specially noted for his powerful advocacy of social reforms. During 1821-23 he visited Europe, and while in England made the acquaintance of Wordsworth and Coleridge. His works include *Remarks on the Life and Character of John Milton*, 1826; *Life and Character of Napoleon Bonaparte*, 1827-8; *Character and Writings of Fenelon*, 1829; *Essay on Self-Culture*.

CHANSONS DE GESTE (songs of deeds), long narrative verse-cycles written in France during XI.-XIII. cent's, describing adventures of knightly heroes. The earliest, and perhaps greatest, is the *Chanson de Roland* (XI.

CHANT ROYAL

cent.). There are several cycles dealing with the exploits of Charlemagne and his knights, Ogier the Dane, and others. In one of these, *The Pilgrimage to Jerusalem*, the Alexandrine verse was first used in French.

CHANT ROYAL, Fr. mediæval verse-form, somewhat like the *ballade*, consisting of sixty lines, in five strophes and an envoi, and having only five rhymes; much used for songs in praise of the Virgin.

CHANTABUN (12° 28' N., 102° 20' E.), town, C. province, Siam; rubies, sapphires.

CHANTADA (42° 37' N., 7° 47' W.), town, Lugo province, Spain; tiles, tanneries. Pop. 5,000.

CHANTAL, STE. JEANNE FRANCOISE DE (1572-1641), Fr. lady who founded the Order of the Visitation; grandmother of Mme de Sévigné (q.v.); feast-day, Aug. 21.

CHANTILLY (49° 9' N., 2° 27' E.), town, on Nonette, Oise, France; formerly celebrated for manufacture of lace; has magnificent Renaissance château, destroyed by Revolutionaries, 1793, rebuilt by Duc d'Aumale, and presented to Fr. Institute, 1886; horse-racing center. Pop. 4,900.

CHANTONNAY (46° 41' N., 1° 4' W.), town, Vendée, France. Pop. 4,100.

CHANTREY, SIR FRANCIS LEGATT (1782-1841), Eng. sculptor. A fine example of C.'s work is the *Sleeping Children*, in Lichfield Cathedral; and his best-known statues are those of George Washington, at Boston; George III., in London Guildhall; George IV., at Brighton; Pitt, in Hanover Square, London; John Dalton, at Manchester, etc.

CHANTRY.—(1) oratory founded for chanting masses for the departed or prayers for the living according to terms of bequest. (2) in XVI. cent. chapel below rank of parish church.

CHANUTE, a city of Kansas in Neosho co. It is on the Atchison, Topeka and Santa Fe, and the Missouri, Kansas and Texas railroads. The city is important industrially and has manufactures of glass, brick, cement, tools, flour, etc. There are also important oil refineries, as it is the center of a large and rich oil and gas district. Pop. 1920, 10,286.

CHANZY, ANTOINE EUGENE ALFRED (1823-83), Fr. general; served at *Magenta* and *Solferino*, 1859; in Syrian

CHAPMAN

campaign, 1860-61; commanded second army of the Loire in the Franco-German War, 1870; gov. gen. of Algeria, 1873-79; ambassador to Russia, 1879-81; nominated for Pres. of the Republic, 1879, receiving one-third of the votes.

CHAO-CHOU, or **CHAO-CHAN**, prefectural city, Kuang-tung, China (23° 40' N., 117° 38' E.); exports sugar, oranges, and vegetables; railway to Swatow.

CHAPELAIN, JEAN (1595-1647), Fr. poet; author of epic, *La Pucelle*, which occupied him for twenty years.

CHAPEL-EN-LE-FRITH (53° 21' N., 1° 58' W.), market town, Derbyshire, England; paper-making and cotton industries. Pop. 16,600.

CHAPELLE, appellation of Charles Emmanuel Lullier, 1626-86, Fr. poet and wit of classical school.

CHAPLAIN, clergyman who officiates at court, or in private chapels; in work-houses and hospitals, etc.; there are also bp.'s c's, army c's, and navy c's.

CHAPLAIN, CHARLES JOSHUA (1825-91), Fr. society portrait-painter.

CHAPLIN, CHARLES SPENCER (1888), comedian, was born near London and is mainly self-educated. He first became connected with the stage at the age of seven, being employed in London music halls. He attracted a certain amount of favorable notice in *A Night in an English Music Hall*, and came to the United States with this play, performing the leading role himself. He made his first appearance on the screen in 1914 with the Keystone Film Company, and has since made contracts with other leading film companies. In 1917 he signed a contract with the First National Exhibitors' Circuit to make two eight reel pictures for \$1,000,000, and has since starred in productions of his own creation, having his own motion picture plant at Hollywood, California.

CHAPMAN, ARTHUR (1873), educated at public schools. Was a reporter for the Chicago Daily News from 1895-8 and the Denver Republican from then until 1913. In 1916 he became managing editor of the Denver Times and remained with that paper until 1919 when he went with the New York Tribune as a special writer. Among his works are *Out Where the West Begins*, 1917; *Cactus Center*, and *Mystery Ranch* in 1921. Also contributed to magazines.

CHAPMAN, FRANK MILCHER (1864), ornithologist, was born at Englewood, N.J., and since 1887 has held various posts in the American Museum of Natural History in New York.

CHAPMAN

He is a member of various scientific societies, and the author of numerous works on birds and bird life.

CHAPMAN, GEORGE (1559-1634), Eng. dramatist and translator; b. near Hitchin; ed. Oxford; wrote numerous plays, of which the earliest was *The Blind Beggar of Alexandria*, 1596, followed by *Bussey d'Amboise*, *All Fools*, *Gentleman Usher*, *Monsieur d'Olive*, *Eastward Hoe* (with B. Jonson), etc.

CHAPMAN, JOHN JAY (1862), author, was born in New York. He was educated at Harvard, afterwards reading law, and was admitted to the bar in 1888, but has not practiced since 1898. He is the author of numerous books and essays and of several plays in verse.

CHAPMAN, J. WILBUR (1859), clergyman, was born at Richmond, Indiana, and educated at Lake Forest University, and at Lane Theological Seminary. He was ordained a Presbyterian minister in 1882, and as an evangelist has worked in all parts of the country, and is now representative at large for the Evangelistic Committee of the Presbyterian Church. He is the author of numerous works of a religious nature.

CHAPONE, HESTER (1727-1801), Eng. letterwriter and essayist; dau. of Thomas Mulso, a Northamptonshire gentleman; admiral and correspondent of Samuel Richardson; m. a solicitor, John C.; wrote *Letters on the Improvement of the Mind* (1772).

CHAPPELL, WILLIAM (1809-88), Eng. music editor and publisher; partner in Messrs. Chappell & Co.; noted for his collection and publication of *Popular Music of the Olden Time*, 1855-59.

CHAPPLE, JOE (JOSEPH) MITCHELL (1867), born in La Porte, Ia. Was educated at Cornell College and received hon. M.A. from same in 1904; (LL.D., Lincoln Memorial Univ. 1915). Edited a paper at Grand Rapids, N.D. at the age of sixteen and later became editor and proprietor of the *Ashland Daily Press*. Was also engaged in newspaper work in Chicago until 1897 when he took charge of the *Bostonian*, changing the name to the *National Magazine* of which he was editor and publisher. Author of *The Minor Chord*, 1895; *Boss Bart*, *Politician*, 1896; *Mark Hanna*, 1903; *Heart Throbs*, 1906; *The Panama Canal*, 1907; *The Happy Habit*, 1908; *Heart Songs*, 1909; *Little Helps*, 1910; *History Making*, 1911; *Heart Letters*, 1912 and *Heart Chord* in 1915. Also produced the motion pictures, *Heart Throb* and *Annie Lee*.

CHARDIN

CHAPRA, CHUPRA (25° 46' N., 84° 46' E.), chief town, Saran district, near junction of Gogra and Ganges, Bihar and Orissa, India; indigo. Pop. 47,000.

CHAPTAL, JEAN ANTOINE CLAUDE (1756-1832), Fr. chemist and statesman; prof. Chem., Montpellier, 1781; minister of Interior, 1800-4, minister of Commerce, 1811; founded Fr. Chamber of Commerce.

CHAPTER.—(1) assembly of members of a religious house (conventual c.) or order (in a provincial or general c.); (2) body which with the dean is governing body of a collegiate or cathedral church. Name is probably derived from the portions of the Rule or the Scriptures read out when this body came together. The members of c's were termed canons, or prebendaries, the latter being of inferior status.

CHAPTER-HOUSE, building where a cathedral or monastic chapter meets; used sometimes as place of sepulture, as at Wells and Westminster.

CHAPU (30° 35' N., 121° 10' E.), seaport, province of Chekiang, China; formerly had important trade with Japan.

CHAR, name for several palatable fishes of the genus *Salmo* occurring in clear mountainous lakes, (e.g.) in Scandinavia, Switzerland, Scotland, Ireland, and Wales.

CHARCOAL, form of amorphous carbon; (1) *wood c.*, prepared by limited or smothered combustion of wood; black, porous solid used for fuel, gunpowder, filters, crayons, and as a deodorant; (2) *animal or bone c.*, obtained by charring bones, used as a decolorizer in sugar-refining.

CHARCOT, JEAN MARTIN (1825-93), Fr. physician, prof. of Pathology in medical faculty of Paris, and physician at the Salpêtrière, 1860; made investigations on neurology, hypnotism, etc.

CHARD (50° 53' N., 2° 59' W.), market town, Somersetshire, England; lace. Pop. 1911, 4,568.

CHARD, JOHN ROUSE MERRIOTT (1847-97), Eng. soldier; hero of *Rorke's Drift*. Ordered to S. Africa during the Zulu War of 1879.

CHARDIN, SIR JOHN (1643-1713), Fr. traveler; b. Paris; s. of a jeweler; spent many years in Eastern travel; settled in London, 1681, and was knighted by Charles II.; went to Holland, 1683, as representative of East India Company; pub. *The Travels of Sir John Chardin into Persia and the East Indies*

CHARENTE

(London, 1686); buried in Westminster Abbey.

CHARENTE (45° 40' N., 0° 10' E.), inland department, France, formed principally from old province Angoumois; traversed by Charente; surface undulating, wooded hills, sandy plains; exports wheat, brandy (cognac); capital, Angoulême (*q.v.*); area, 2,305 sq. miles. Pop. 1911, 346,424.

CHARENTE (45° 55' N., 1° 10' W.), river, France; enters Atlantic.

CHARENTE-INFÉRIEURE (45° 45' N., 0° 40' W.), maritime department, W. coast, France, nearly corresponding to old provinces of Saintonge and Aunis; includes islands of Ré and Oléron; well cultivated; good pastures; exports brandy and salt; oyster and pilchard fisheries important; capital, La Rochelle; area, 2791. Pop. 455,000.

CHARENTON-LE-PONT (48° 47' N., 2° 25' E.), town, on Marne, France; manufactures artificial flowers, porcelain. C. in French is equivalent of Eng. 'Bedlam.' Pop. 17,980.

CHARENTE (1763-96), name of leader of rebels of La Vendée; fell at Nantes.

CHARGÉ D'AFFAIRES, fourth grade of diplomatic agent, usually sent in place of an ambassador. His credentials are endorsed by the foreign minister, and not by the sovereign.

CHARIBERT (*d.* 567), Frankish king; s. of Clotaire I.; notorious for dissolute habits; on death of his *f.*, received as his share of the kingdom Paris, Rouen, Tours, Bordeaux, and several other towns.

CHARIDEMUS (*d.* 333 B.C.); Grk. mercenary who, in 351, led the Athenians against Philip II. of Macedon, in the Chersonese.

CHARING CROSS, district, W. end of Strand, London; site of old village of Charing and one of the crosses erected by Edward I. in memory of Queen Eleanor.

CHARIOT, ancient horse vehicle used by Greeks, Romans, Egyptians, Assyrians, Persians, etc., first in war, but later only in games and processions. These conveyances were without springs of any kind, the body resting on the axle.

CHARITE-SUR-LOIRE (47° 11' N., 3° 2' E.), town, France. Pop. 5,200.

CHARIVARI (Fr.), hideous din caused by beating on tin kettles, etc., and employed as a mock-serenade in the case of unpopular weddings in mediæval

CHARLEMAGNE

France. Later, as the medium of ridicule, became the name of a Parisian journal established 1832; from which is derived the sub-title of the Eng. *Punch*.

CHARKHARI (25° 30' N., 79° 50' E.), native state, Bundelkhand, Central India; area, 703 sq. miles. Pop. 130,000.

CHARLEMAGNE, CHARLES THE GREAT, CHARLES I. (742-814), King of the Franks, Emperor of the West, and perhaps greatest figure of the Middle Ages; s. of Peppin the Short, King of the Franks, and Bertha, dau. of Count Charibert of Laon; place of his birth unknown, and it is uncertain whether his parents were then married. In 768 King Peppin divided his kingdom between his sons, Charles and Carloman, and on the latter's death in 771 the elder son became sole King of the Franks. In 772 he conducted a war against the Saxons, who threatened the Frankish frontiers, and advanced as far as the Weser, when he was recalled to the aid of Pope Adrian I., who was in conflict with Desiderius, the Lombard king. C. had married a dau. of this monarch, but repudiated her because she bore him no offspring, afterwards uniting himself with Hildegarde, an Alemannian princess. Desiderius was endeavoring to compel the Pope by force of arms to establish the sons of Carloman in their *f.*'s territory.

C. crossed the Alps with two large armies, and succeeded in conquering the Lombard kingdom, 774, which he added to his possessions. During the years immediately following he was constantly engaged in warfare. He won a victory over the Saxons, who acknowledged him as their king; was called to Spain, 778, as intermediary between the Moors and Arabs, where he secured considerable territory, but lost Roland, Oliver, and other knights in the famous fight at the Pass of Roncesvalles. On Christmas Day, 800, C. was crowned emperor by Pope Leo III., and saluted as Carolus Augustus; the remaining years of his life were chiefly devoted to the consolidation of his great empire, and an attempt to revive Rom. civilization, encouraging Alcuin (*q.v.*) in establishment of schools and commencing codification of the laws in the famous Capitularies; buried at his capital, Aachen; his empire was soon after his death dismembered.

In personal appearance C. is said to have been tall and of a robust frame, with handsome features. He was sparing in his diet, loved hunting and other manly exercises, and was devoted to his children. Though he was unable to write, he read Latin and Greek, and was greatly interested in history and astronomy. As a soldier his successes

were due rather to his ability as an organizer than personal brilliance in the field. His descendants, the 'Carolingians,' reigned over France until the death of Louis V. 985. His exploits, real and imaginary, were the subject of a cycle of romance.

CHARLEMONT, JAMES CAULFELD, 1ST EARL OF (1728-99), Irish statesman; man of fearless and resolute character, with literary and artistic tastes; prominently associated with Grattan in the assertion of Irish independence.

CHARLEROI, town, Hainault, Belgium (50° 24' N., 4° 27' E.), on Sambre; collieries, iron foundries, glass, hardware; taken by French, 1794. In the World War the French met at Charleroi the first shock of the main German armies against the Allied front; the battle, which began on Aug. 21, 1914, ended next day with the rapid retreat of the Fr. 5th Army under Lanrezac. Pop. 29,400.

CHARLEROI, a borough of Pennsylvania, in Washington co. It is on the Pennsylvania railroad and the Monongahela river. Its industries include mining and the manufacture of glass and shovels. Pop. 1920, 11,516.

CHARLES I. (1600-49), King of Gt. Britain and Ireland; 2nd s. of James I.; b. Dunfermline; succ. March 27, 1625; m. Henrietta Maria of France, May 1625. C. dissolved his first two Parliaments because of their opposition to his favorite Buckingham. In 1628 a third Parliament compelled the king to redress the grievances stated in the *Petition of Right*, viz. forced loans, arbitrary imprisonment, illegal billeting of soldiers, and commissions of martial law. Early in 1629 Parliament attacked C. for levying tonnage and poundage, and for furthering Abp. Laud's innovations in religion. For eleven years C. ruled without Parliaments, raising money unconstitutionally.

Advised by his chief supporter Wentworth, now Earl of Strafford, C. summoned a Parliament (*Short Parliament*, April 13-May 5, 1640), which refused supplies, and was dissolved. In Aug. C. was defeated in the Second *Bishop's War* against the Scots, and in Nov. again summoned Parliament (*Long Parliament*). C. consented to various reforms, and was forced to sign a bill of attainder against Strafford, who was beheaded May 12, 1641.

Following an attempt to arrest five members with an armed force in the House of Commons, Jan. 4, 1642, C. abandoned the capital, Jan. 10. The N. and N.W. were strongly Royalist, and on Aug. 22 C. set up his standard at

Nottingham. After an indecisive battle at *Edgehill*, Oct. 23, C. was victorious in 1643 at *Adwalton Moor*, *Roundway Down*, and *Crooked Bridge*. At the end of the year the Scots gave their help to Parliament, while the Royalists were reinforced by the army from Ireland. On July 2, 1644, Prince Rupert was defeated at *Marston Moor*, and the North fell to Parliament. The Parliamentary army, remodelled by Cromwell, gave the Royalist cause its deathblow at *Naseby*, June 14, 1645.

In April 1646 C. sought the protection of the Scots, who surrendered him to the Eng. Parliament. The army, now divided against the Parliament, seized C. and imprisoned him at Carisbrooke. The Royalists rose in Wales and Kent, and Parliament, largely Presbyterian, negotiated with the king, but its action was nullified by the army. A High Court of Justice was, however, appointed by the Rump of Independents to try the king, and he was beheaded as a traitor at Whitehall, Jan. 30, 1649. C. had many traits, but had little appreciation of men and forces.

CHARLES II. (1630-85), King of Gt. Britain and Ireland; s. of Charles I.; b. London; took part in Civil War and retired to France. Ormonde in Ireland and Montrose in Scotland took up arms for C., but he repudiated both in order to gain support of Covenanters; landed in Scotland, 1650, and was crowned at Scone. After defeat of Presbyterians at Dunbar, C. discarded their aid and marched S. with Huntly; defeated at Worcester, fled to France, and wandered over W. Europe till he was recalled to England in 1660.

The 'Popish Plot' was successful in arousing opposition to Roman Catholicism, and an Exclusion Act was introduced debarring them from reigning—directed against James, Duke of York. Charles' astuteness secured its defeat. He died a Roman Catholic. Compared with his father, C. is a poor person indeed. He was profligate, untrustworthy, thoroughly insincere, but he knew when to bend to public opinion, and this pliability, coupled with geniality and air of frankness, secured his popularity.

CHARLES I.-VII., Holy Rom. Emperors; for Charles I., see **CHARLEMAGNE**.

CHARLES II, THE BALD (823-77), Holy Roman Emperor and King of the West Franks (modern France); s. of Emperor Louis the Pious; succ., 843.

CHARLES III, THE FAT (823-88), Holy Rom. Emperor and King of the West Franks; s. of Emperor Louis;

CHARLES IV.

succ. his bro's in the inheritance of his *f.*'s territories; was crowned Rom. emperor by Pope John VIII. in 881; but was deposed by his nobles, 887; reckoned as Charles II. of France.

CHARLES IV. (1316-78), Holy Rom. Emperor and King of Bohemia; *b.* Prague; *s.* of King John of Bohemia; fought at *Crecy*, 1346, where his *f.* was killed; largely extended Bohemian territory, and was noted for the exemplary wisdom of his government; he founded the first Ger. univ. at Prague, 1348, and promoted agriculture and various industries.

CHARLES V., CHARLES QUINT (1500-58), Holy Rom. Emperor and King of Spain (Charles I.) *b.* Ghent; *s.* of Philip of Burgundy and Joanna, dau. of Ferdinand and Isabella of Spain. From his *f.* he inherited the Low Country dominions and Burgundy, and through his mother he became heir to the kingdoms of Spain and Naples, and the rich possessions in Spain. America. On the death of King Ferdinand, 1516, C. left the Netherlands for Spain, where he was recognized as joint ruler with his mother, who had now become hopelessly insane; and on the death of his paternal grandfather, the Emperor Maximilian, in 1519, he was elected Emperor of Germany, the rival candidate being Francis I. of France. By virtue of his great possessions C. became the most influential political figure of his time, and thus began the intense rivalry between himself and Francis I., which dominated the history of W. Europe during the next quarter of a century. The conflict was waged in many quarters, but most decisively in Italy, where the French were dispossessed of the duchy of Milan, and finally driven out of Italy altogether. In 1525, however, Francis again entered Italy, occupied Milan, but was taken prisoner at Pavia, and, being carried to Madrid, was only released upon signing a treaty in which he resigned all his claims and pretensions.

Like his notorious *s.*, Philip II., C. was a religious zealot, and a relentless opponent of Lutheranism. It was, therefore, his earnest desire to witness the restoration of Ger. allegiance to the see of Rome. In this dream, however, he was doomed to disappointment, for the Peace of Augsburg, 1555, brought about by the formidable Prot. opposition under Maurice of Saxony, compelled him to acquiesce in the establishment of Protestantism over the greater part of Germany. This blow to his hopes, and his declining health, led to his abdication in favor of his *s.* Philip, 1556, and he retired to the monastery of San Yuste, in Estremadura, where he lived in great

CHARLES VI.

seclusion, but continued to direct the policy of his successor.

CHARLES VI. (1685-1740) Holy Rom. Emperor; *s.* of Emperor Leopold I.; his claim to the throne of Spain, on the death of Charles II., brought about the War of Span. Succession. He was proclaimed emperor, 1711, on the death of his bro., Joseph I. An only *s.* died in infancy, and the succession was secured to his dau., Maria Theresa, by the Pragmatic Sanction.

CHARLES VII. (1697-1745), Holy Rom. Emperor and Elector of Bavaria; *s.* of Elector Maximilian Emanuel, whom he succ., 1726, having m. Maria Amelia, dau. of Emperor Joseph I. He became one of the claimants in the War of the Austrian Succession, refusing to recognize the 'Pragmatic Sanction,' 1713, by which Charles VI. had secured to his own dau., Maria Theresa, the succession of the Hapsburg dominions. He proclaimed himself King of Bohemia, 1741, and was elected emperor, 1742, but was eventually driven from Bavaria.

CHARLES I.-X., Kings of France. In some chronologies Charlemagne and Charles the Bald are reckoned as Charles I. and II. of France, in others Charles the Bald and Charles the Fat.

CHARLES III., THE SIMPLE (879-929), King of France, *s.* of Louis 'the Stammerer'; his reign was chiefly notable for the treaty of peace, 911, by which he conferred upon Rollo, a Norman chief, and his heirs, the hereditary dukedom of Normandy.

CHARLES IV., THE FAIR (1294-1328), King of France; youngest *s.* of Philip IV.; succ. his bro., Philip V., as King of France and Navarre, 1322.

CHARLES V., THE WISE (1337-80), King of France; *s.* of John II.; his *f.* was captured at Poitiers, 1356, but C. escaped, and ruled in his *f.*'s stead during John's long captivity in England. He came to the throne in 1364, and, with the aid of Bertrand du Guesclin, succeeded in clearing France of the mercenary bands which ravaged the country, sending them against the English in Spain, and finally driving the English out of the greater part of France.

CHARLES VI., LE BIEN-AIMÉ (1368-1422), King of France; *s.* of Charles V., succ. his *f.* when twelve, the government of the country being in the hands of his uncles, the Dukes of Anjou, Berry, Burgundy, and Bourbon; he m. Isabeau of Bavaria, dau. of Stephen II., 1385; was crowned in 1389. Henry V. of England, 1414, having formed an alliance with the Duke of

Burgundy, revived the Eng. claim to Fr. throne, and won victory of Agincourt, 1415; compelled C. to sign Treaty of Troyes.

CHARLES VII., THE INDOLENT, later **THE VICTORIOUS** (1403-61), King of France; s. of Charles VI.; his title to the throne of France was disputed by Henry VI. of Eng., N. France being ruled by the Duke of Bedford, until the advent and successes of Joan of Arc eventually gave C. rule over the entire kingdom. It is to the lasting shame of this king that he made no effort to save Joan from her fate. See **FRANCE** (*History*).

CHARLES VIII. (1470-98), King of France; s. of Louis XI.; succ. at age of thirteen; was an utterly vain and worthless king, his head being filled with vague dreams of military glory, which never came to fruition.

CHARLES IX. (1550-44), King of France; 3rd s. of Henry II. and Catherine de' Medici; succ. his bro., Francis II. 1560. He submitted, easily for the most part, to the empire of his mother, who lured him from his attachment to the gallant Admiral de Coligny, and was, throughout his short life, his evil genius, compelling him, amongst other things, to sanction the Massacre of St. Bartholomew.

CHARLES X. (1757-1836), King of France; reigned 1824-30; 3rd s. of the Dauphin, Louis, grandson of Louis XV., and younger bro. of Louis XVI. and Louis XVIII.; before his accession known as Count of Artois. His youth was marked chiefly by dissipation and boundless extravagance; succ. Louis XVIII., but his short reign involved him in frequent troubles with his people, chiefly by reason of his incompetency. He abdicated, 1830, and was succ. by Louis Philippe, Duke of Orleans.

CHARLES I.-IV., Kings of Spain. For Charles I., see Emperor Charles V.

CHARLES II. (1661-1700), King of Spain; s. of Philip IV.; was feeble from birth, and grew up ignorant and incapable, and d. of senile decay.

CHARLES III. (1716-88), King of Spain; s. of Philip V. and Elizabeth Farnese; succ. his bro., Ferdinand VI., 1759. He expelled the Jesuits, reduced the Inquisition to a state of inactivity, encouraged trade, and built many of the finest buildings of modern Spain.

CHARLES IV. (1748-1819), King of Spain; 2nd s. of Charles III. and Maria Amelia of Saxony. His elder bro. was an imbecile, and therefore incapable of

ruling, while C. was probably the most foolish king who ever occupied the Span. throne. His fleet was destroyed by Nelson at Trafalgar. He abdicated at Napoleon's suggestion, and d. at Rome.

CHARLES IX. (1550-1611), King of Sweden; s. of Gustavus Vasa; was recognized as king, 1600; crowned, 1607; during his short reign he was engaged in wars with Russia and Denmark, which were continued, after his death, by his s., Gustavus Adolphus.

CHARLES X. (1622-60), King of Sweden; s. of John Casimir, Count Palatine of Zweibrücken, and Catherine, dau. of Charles IX.; succ. his cousin, Queen Christina, who resigned in his favor.

CHARLES XI. (1655-97), King of Sweden; only s. of Charles X.; was only four years of age at his f.'s death, and up to the time of his majority at the age of seventeen his education was sadly neglected. But, upon his accession, he threw himself diligently into the business of administration.

CHARLES XII. (1682-1718), King of Sweden; s. of Charles XI.; succ., 1697. A hostile league was formed in 1699 by Russia, Denmark, and Poland for the overthrow of Sweden, but C., in spite of his youth, landed near Copenhagen, and compelled the Dan. king to sue for peace. Next he turned his arms against the Czar Peter I., and with about 9,000 men routed 50,000 Russians at Narva, Nov. 30, 1700. Then he proceeded to the reduction of Poland, dethroned Augustus II., and compelled the election of Stanislaus Leszenzynski as King of Poland. His subsequent operations against Russia were unsuccessful, and he became a prisoner to the Turks, whose aid he had unsuccessfully sought. He contrived, however, to escape, and in a brief space of time was busy preparing an expedition against Norway, during the progress of which he was killed by a stray shot before the fortress of Fredrikshald.

CHARLES XIII. (1748-1818), King of Sweden and Norway; s. of Adolphus Frederick, King of Sweden. By this union, 1814, C. became King of Sweden and Norway.

CHARLES XIV. (1763-1844), King of Sweden and Norway; his name was Jean Baptiste Bernadotte; s. of Henri Bernadotte; b. Pau; entered Fr. army, 1780; won speedy promotion during progress of Fr. Revolution; commander of army in La Vendée, 1800-1; made Marshal of France under the Empire; gov. of Hanover, 1804-5. He was adopted as heir by Charles XIII., whom he succ., 1818.

CHARLES XV. (1826-72), King of Sweden and Norway; *s.* of Oscar I.; became regent, 1857; succ. his *f.* as king, 1859.

CHARLES II., THE BAD (1332-87), King of Navarre; *s.* of Jeanne II., Queen of N., and Philip, Count of Evreux; *m.* Jeanne, dau. of King John II. of France.

CHARLES III., THE NOBLE (1361-1425), King of Navarre; *s.* of above. His reign was memorable for its peace and the improved economical conditions which his care brought about.

CHARLES I. AND II., Kings of Naples and Sicily.

CHARLES I. (1226-85), King of Naples and Sicily, and Count of Anjou; *s.* of Louis VIII. of France, and bro. of St. Louis; accompanied the latter on a crusade in Egypt, 1248; received crown of Naples and Sicily from Clement IV., 1248.

CHARLES II. (1250-1309), King of Naples and Sicily; *s.* of preceding; was a prisoner in the hands of King Peter of Aragon at time of his *f.*'s death, but was released later on condition that he resign crown of Sicily to Aragon.

CHARLES (1771-1847), Archduke of Austria; *b.* Florence; *s.* of Emperor Leopold II.; gov. of the Netherlands, 1790; was engaged in battles with the French from his twenty-first year; defeated Masséna at Caldiero, Italy, in Oct., 1805; was several times opposed to Napoleon, whom he defeated at Aspern and Esslingen, 1809.

CHARLES I. (1887-1922), Emperor of Austria and King of Hungary as Charles IV.; *b.* Vienna. He was *s.* of Archduke Otto Franz Joseph of the Hapsburg royal house. The assassination of his uncle, the Archduke Franz Ferdinand, at Serajevo, Bosnia, in 1914, which furnished the occasion for the outbreak of the World War, made Charles the heir apparent, and he acceded to the throne on the death of his granduncle, Emperor Francis Joseph, on Nov. 21, 1916. His character was amiable but not strong enough to cope with the problems of his country. He had no heart for the war and the letters written to his wife's brother, Sixtus of Bourbon, in which he proposed a plan for ending it, roused the wrath of Germany and created a state of tension between the Central Powers. Following the armistice Charles escaped to Switzerland. Twice he returned from exile in the hope of regaining his throne but failed and as a result of the second attempt was banished by the Allied Powers to the Island of Madeira, where he died shortly afterward.

CHARLES, OR CARLOS (1839-1914), King of Rumania; Prince of Hohenzollern-Sigmaringen; elected Prince of Rumania, 1866; was proclaimed king, 1881; married Princess Elizabeth of Wied, 1869, better known as 'Carmen Sylva.' As a Hohenzollern, was averse to hostile action against Germany in the World War, shortly after outbreak of which he *d.*; was succeeded by nephew Ferdinand, the present king, who married Marie, daughter of the Duke of Saxe-Coburg.

CHARLES ALBERT (1798-1849), King of Sardinia; succ. his cousin, Charles Felix, 1831; abdicated, 1849, in favor of *e. s.*, Victor Emmanuel, who afterwards became first King of Italy.

CHARLES EDWARD STEWART, PRINCE (1720-88), 'The Young Pretender,' *s.* of James, 'Old Pretender'; *b.* Rome; took part in Don Carlos' expedition against Naples, 1734; attempted, with French help, invasion of England, but was driven back by storm, 1744; landed in Scotland, 1745, and obtained support first of Lochiel then of many Highland chiefs; defeated Cope at Prestonpans, Sep. 20; took Carlisle; reached Derby, Dec. 4; compelled to retreat by desertion of troops; marched north, defeating Hawley at Falkirk; utterly defeated at Culloden by Duke of Cumberland, April 16, 1746.

CHARLES EMMANUEL I. (1562-1630), Duke of Savoy; succ. his *f.*, Emmanuel Philibert, 1580; *m.* Catherine, sister of Henry of Navarre; upon the murder of Henry III. of Valois, C. aspired to Fr. throne, but the recognition of the King of Navarre as Henry IV. of France put an end to his hopes.

CHARLES LE BON (1804-1127), Count of Flanders; *s.* of King Knut IV. of Denmark; was named as heir to the countship of Flanders by his cousin, Baldwin VII., whom he succ. in 1119.

CHARLES 'LEOPOLD' (1643-90), Duke of Lorraine; nephew of Charles IV.; his duchy was occupied by the French, and he failed, after strenuous efforts, to recover its possession.

CHARLES MARTEL, (i. e.) 'THE HAMMER' (688-741), Frankish king; natural *s.* of Pippin II., mayor of the palace under the last Merovingian kings; was grandfather of Charlemagne; memorable for having stemmed tide of Moslem conquest; but for his efforts, Gibbon tells us, 'perhaps the interpretation of the Koran would now be taught in the schools of Oxford.' He was succ. by his sons, Carloman and Pippin the Short.

CHARLES THE BOLD (1433-77),

Duke of Burgundy; s. of Philip the Good; m. Margaret of York, his third wife, and was thus bro.-in-law of Edward IV. of England; succ. to the duchy in 1467. During the greater part of his life, he was engaged in conflict with the Fr. king, Louis XI., whose vassal he was, and his ambition was to raise Burgundy into a powerful kingdom.

CHARLES CITY, a city of Iowa, in Floyd co., of which it is the county seat. It is on the Illinois Central and the Chicago, Milwaukee and St. Paul railroad, and on the Cedar river. It is an important city industrially and has manufactures of store fixtures, gasoline traction engines, furniture, etc. It is surrounded by an important livestock and dairying community of which it is the chief distributing point. Its public buildings include a public library, an opera house, and a home for the aged. It is the seat also of Charles City College. Pop. 1920, 7,350.

CHARLES, ELIZABETH (1828-96), Eng. novelist; dau. of John Rundle, M.P.; m. Andrew P. Charles, 1851; wrote about fifty books, including a story written around Martin Luther, *The Chronicles of the Schonberg-Cotta Family*, 1862.

CHARLES RIVER, a river in Massachusetts, which flows into Boston harbor, separating Boston from Charleston and Cambridge. It is crossed by many bridges and is navigable for a few miles above Boston

CHARLESTON, a city of Illinois, in Coles co., of which it is the county seat. It is on the Cleveland, Cincinnati, Chicago and St. Louis and other railroads. The city is surrounded by an important oil, gas and coal region and there are manufactures of flour, stoves, tile, etc. It is the seat of the Eastern Illinois Normal College and has a library, parks, and several handsome public buildings, including a court-house. Pop. 1920, 6,600.

CHARLESTON, a city of South Carolina, in Charleston co., of which it is the county seat. It is on the junction of the Ashley and Cooper rivers and is 7 miles from the Atlantic Ocean. Charleston is the most popular city in the State and the most important industrially. It has an excellent harbor and is connected with the west shore of the Ashley river by a bridge. Charleston is built on a peninsula which has an average elevation of 8 to 10 feet above high water. The streets are regularly laid out at right angles. At the southern extremity is a beautiful park called White Point Garden, and east of this is

the Battery, a broad promenade which is a favorite recreation place for the citizens. This is 1,500 feet long and gives an excellent view of the harbor, which has two forts, Sumter and Moultrie, and two batteries, Sargeant Jasper and Capron. The public buildings are grouped for the most part around Meeting and Broad, the two principal streets. They include a court-house, city hall, and the post-office. The United States Customs House is a magnificent structure erected at a cost of \$3,000,000. Facing the city hall is Washington Park, which contains two handsome fountains and a statue of William Pitt which was erected before the Revolution. The park also contains a monument to the Confederate dead.

Charleston has important manufactures, including the making of fertilizers, textiles, iron products, machinery, furniture, flour and clothing. The city has a large commerce. Its financial importance may be indicated by the fact that there are 15 National banks and savings banks. There is an excellent school system and the institutions for higher education include the College of Charleston, Military College of South Carolina, Medical College of South Carolina, and several high, normal and technical schools. Charleston has over 80 churches, of which the most famous are St. Michael's, built in 1752, and St. Philip's, the first church built in the city. There are many charitable institutions, including St. Andrew's Society, founded by the Scotch in 1720; and the South Carolina Society, founded by the Huguenots in 1736. The St. George Society, the oldest chapter of this organization in the world antedates that of the city of London, Eng., having been organized in 1733; The Chamber of Commerce of Charleston was organized in 1773. It was founded in 1670. The city was captured by the British in 1780 but was evacuated in 1782. In Charleston the first decisive movement in favor of secession was made, and in 1860 and 1861 several conflicts took place in the harbor. The attack on Fort Sumter was the first aggressive step in the war. The harbor was blockaded in 1861. The city was bombarded in 1863 and in February, 1865, following a siege of 565 days, was captured by the Federal troops under General Sherman. Pop. 1920, 67,957; 1923, 71,245.

CHARLESTON, a city of West Virginia, capital of the State, and the county seat of Kanawha co. It is at the junction of the Kanawha and Elk rivers and is on the Chesapeake and Ohio and other railroads, 135 miles southwest

steamboat communication with the ports on the Ohio and Mississippi rivers. In the neighborhood are extensive salt springs. The public buildings include a State House, customs house and an opera house. Pop. 1920, 39,608.

CHARLESTOWN, Massachusetts. See BOSTON.

CHARLES TOWN, a village of West Virginia, in Jefferson co., of which it is the county seat. It is on the Baltimore and Ohio and the Norfolk and Western railroads, 10 miles southwest of Harpers Ferry. It is surrounded by an important agricultural region of which it is the center. Charles Town is famous as being the place of the capture, trial and execution of John Brown, whose execution took place here on December 2, 1859.

CHARLESTOWN (17° 8' N., 62° 35' W.), town, Nevis, W. Indies.

CHARLET, NICOLAS TOUSSAINT (1792-1845), Fr. artist and designer; served in the National Guard; later adopted the artist's profession, and excelled in military subjects.

CHARLEVILLE (49° 47' N., 4° 42' E.), town, on Meuse, Ardennes, France; manufactures hardware, leather, and beer. Pop. 18,772.

CHARLEVOIX, PIERRE FRANÇOIS ZAVIER DE (1682-1761), Fr. Jesuit historian; traveled frequently for his order in America and elsewhere; wrote *History of the Church of Japan*, Eng. trans., 1715; *History of San Domingo*, 1730; *History of Paraguay*, 1756; *History of Canada*, Eng. trans., 1769.

CHARLOTTE, a city of Michigan, in Eaton co., of which it is the county seat. It is on the Grand Trunk and the Michigan Central railroads. Its industries, which are important, include the manufacture of furniture, automobiles, bridges, culverts, etc. There is a public library. Pop. 1920, 5,126.

CHARLOTTE, a city of North Carolina, in Mecklenburg co. It is on the Southern, the Seaboard Air Line, and other railroads, and on Sugar Creek, about 225 miles northeast of Atlanta. It is one of the chief centers of the southern cotton mill industry, and is a trade center for the surrounding country. Here is Biddle University and a military institute. There are parks, a public library, opera house, banks, etc. In 1775 the Mecklenburg Declaration of Independence was adopted here, and in 1780 the city was occupied by the British. Pop. 1920, 46,318.

CHARLOTTE AMALIE, St. Thomas (18°24' N., 64° 56' W.), port, St. Thomas, Virgin Islands. Pop. 8,600.

CHARLOTTE, PRINCESS AUGUSTA (1796-1817), only child of Prince George of England (Geo. IV.) and Caroline of Brunswick; m. Leopold of Saxe-Coburg, but left no issue.

CHARLOTTENBURG (52° 32' N., 13° 17' E.), town, Prussia; virtually a suburb of Berlin; has royal palace; famous Technical College; manufactures china, beer, iron goods. Pop. 305,978.

CHARLOTTESVILLE, Virginia, county seat of Albemarle co., 96 miles southwest of Washington, D. C. It is situated on the Rivanna river and is served by the Southern and Chesapeake and Ohio railroads. The city is the center of a rich agricultural district. It has silk, woolen, planing and flour mills, wine presses and cigar factories. The University of Virginia is located there and Monticello, the home of Jefferson, is only three miles away. The town was settled in 1744 and received a city charter in 1888. The waterworks and gas plants are municipally owned. The city has a national bank, daily and weekly newspapers, and is a popular summer resort. Pop. 10,688.

CHARLOTTETOWN (46° 14' N., 63° 10' W.), capital of Prince Edward Island; fine harbor; has woolen factory and iron foundry. Pop. 12,100.

CHARMETTES (c. 45° 30' N., 5° 50' E.), village, Savoia, France; near Chambéry.

CHARNER, VICTOR-JOSEPH (1797-1869), Fr. admiral distinguished in Chin. expeditions.

CHARNOCK, ROBERT (d. 1696), Eng. R.C. priest; was concerned in the plot to assassinate King William III. at Turham Green, Feb., 1696; arrested, found guilty, and hanged in the following month.

CHARNOCKITE, important group of igneous rocks, found India, Ceylon, Madagascar, parts of Africa, France, Norway, Germany, S. America, and Scotland. The tombstone of Job Charnock, d. 1693, the founder of Calcutta was made from this stone, and Dr. T. H. Hallam named it after him. The rocks are regarded as belonging to the Archæan age.

CHARON (classical myth.), s. of Erebus and Nox; a minor deity whose business it was, for payment of an

obolus, to ferry souls of the departed across the Styx to the infernal regions.

CHARPENTIER, GUSTAVE (1860), Fr. composer; b. Alsace-Lorraine; studied violin; best known work, the romantic opera *Louise*; also wrote *Julien*.

CHARPENTIER, FRANÇOIS (1620-1702), Fr. man of letters; pub. *Vis de Socrate*, 1650; trans. Xenophon's *Cyropaedia*, 1658; and other works.

CHART, marine map, showing the nature of the sea floor, with soundings for use of the seafaring population.

CHARTRE CONSTITUTIONNELLE, the Magna Carta of France, obtained from Louis XVIII., 1814, and expanded after Revolution, 1830.

CHARRON, PIERRE (1541-1603), Fr. theologian; after studying for law entered the Church, became canon, and was app. preacher in ordinary to Marguerite of Valois. He attacked the League in his *Discours Chrétiens*, 1589; championed Catholicism in *Les Trois Verités*, 1594; while his *De la Sagesse*, 1601, brought down upon him the charge of atheism. He lived on intimate terms with Montaigne.

CHARTER, a written instrument conferring certain privileges, granted by the Crown, the most famous example in Eng. history being Magna Carta given by King John. C's are now chiefly granted to Univ's, corporations, public companies, and similar bodies. The term is also used in the sense of 'to hire,' as to charter a vessel; and was used by Shakespeare in the sense of license ('charter'd libertine').

CHARTERED COMPANIES are trading corporations existing under a charter from a sovereign power, usually for a fixed period, and limited by clearly defined regulations. Such companies existed amongst foreign nations long before they were instituted by Eng. merchants. The Hanseatic League, which maintained its Eng. branch at a place known as the Steel Yard, on the Thames embankment, until the yard was closed by Queen Elizabeth, dates from the XIII. cent. Eng. trading companies came into existence under Elizabeth. The most famous was the East India Company, instituted for the purpose of opening up an Eng. trade with India and the Far East. It received its first charter in 1600, and became the ruling power in India, and it was not until 1858 that its powers were finally absorbed by the Crown.

Second only in importance is the Hudson's Bay Company, which was established in 1670, when Charles II.

granted a charter to Prince Rupert and seventeen other speculators, who were described as 'the Governor and Company of Adventurers of England trading into Hudson's Bay.' Other early companies were the Turkey and Russian Companies, while later institutions have been the National African Co., 1881, which secured the lower Niger for Brit. trade, the Brit. North Borneo Co., 1881; Royal Niger Co., 1886; which enjoyed all rights of government in its territories until they were incorporated with N. and S. Nigeria, 1900; the Imperial Brit. East Africa Co., 1888.

CHARTERHOUSE (Eng. form of *Chartreuse*), famous London school occupying the site of a Carthusian monastery founded by Sir Walter de Manny, 1371. The school itself was founded and endowed under the will of Thomas Sutton, 1532-1611, a London merchant. The number of foundation scholars was at first limited to 40, but has since been increased.

CHARTER OAK, great tree formerly standing in Hartford, Conn., and derived its name from the tradition that a hollow in it formed the hiding-place of the charter of the Connecticut colony, which was placed there to avoid confiscation by Andros, the British governor in 1687. James II., finding the charter in the way of his project to make Connecticut a part of his consolidated New England plan, demanded through Andros its surrender. When the charter was produced in Andros' presence at night, the candles were suddenly extinguished, and when they were relighted the charter had disappeared. When James was overthrown, the charter was again brought from its place of concealment. The oak, which was nearly seven feet in diameter and reputed to be a thousand years old, was blown down in a storm. Aug. 21, 1856. A section of the trunk is preserved in the rooms of the Connecticut Historical Society.

CHARTERS TOWERS (20° 6' S., 146° 6' E.), town Devonport county, Queensland, Australia; gold mines. Pop. 20,000.

CHARTIER, ALAIN (d. 1430), Fr. poet; was sec. to Charles VII.; famous for his poems, *Le Lay des Quatre Dames*, *Debat du reveille-matin*, *La Belle Dame Sans Merci*, etc. A prose work, *Le Curial*, was trans. and pub. by Caxton.

CHARTISM, popular movement demanding, 1838, universal suffrage, vote by ballot, annual parliaments, payment of members, and abolition of property qualification—"The People's Charter." Parliament refused to receive the pe-

tition; came to a head in 1848, when a huge procession was massed, by the strategic disposition of troops about London overawed the demonstrators, and the menace passed away.

CHARTRES (48° 26' N., 1° 29' E.), city, Eure-et-Loir, France; formerly capital of Beauce; seat of bp.; cathedral of Notre Dame is one of most magnificent in France; scene of coronation of Henry IV., 1594; obelisk to memory of General Marceau; taken by Germans, 1870; hosiery, leather manufactured. Pop. 19,232.

CHARTREUSE, LA GRANDE, formerly mother house of Carthusians, founded by St. Bruno, 1084. The present building, dating only from XVII. cent., is situated in the mountainous country c. 13 miles N. of Grenoble. The monks were expelled, 1793; returned, 1816; again expelled in 1904, and are now settled at Lucca and Tarragona. The profits from their world-famous liquor have been almost entirely devoted to church-building and benevolent purposes.

CHASE, FREDERICK LINCOLN (1865), b. in Boulder, Colo. Graduated from the University of Colorado in 1886; Ph.D., Yale, 1891. Became assistant in Yale observatory in 1890, was asst. astronomer 1891 to 1911, and acting director from 1910 to 1913. Author: *Helium Triangulation of the Victoria Comparison Stars* (annals of the Cape Obs., 1897); *Triangulation of the Principal Stars of the Cluster in Coma Berenices* (trans. Yale University Obs., vol. 1, part. V, 1896); *Parallax Investigations on 163 Stars mainly of Large Proper Motion* (trans. Yale Obs., Vol. 2, Part 1, 1906); *Parallax Investigations on 55 Selected Stars*, Vol. 2, part 2, 1910); *Parallax of 41 Southern Stars*, Vol. 2, part 3, 1912; *Catalogue of Yale Parallax Results*, Vol. 2, part 4, 1912 and miscellaneous papers in Astron. Journal.

CHASE, GEORGE (1849), b. in Portland, Me. Graduated (valedictorian) from Yale in 1870; LL.B., Columbia University Law School, 1873. Was admitted to the New York bar in 1873. Was instructor and assistant professor in municipal law, 1873-8, and professor in criminal law, torts and procedure from 1878-91 at Columbia University. In 1891 became dean in New York Law School. Was author of Chase's edition of *Blackstone's Commentaries for American Students*; *Stephen's Digest of the Law of Evidence and Chase's Cases on Torts*. Was also assistant editor of Johnson's Universal Encyclopedia.

CHASE, JOSEPH CUMMINGS

(1878), b. in Kents Hill, Me. Studied art at Pratt Institute, N. Y., Pennsylvania Academy of Fine Arts and Académie Julien, Paris, under Jean Paul Laurens. Exhibited in Paris Salon. In 1904 won first and second prizes in the Grunwaldt poster competition. Was a portrait painter and during the World War painted at the front, in all 142 portraits of officers of the A.E.F., including General Pershing and staff. Also did portraits of many 'doughboys' who had been cited for extraordinary heroism and several officers of the Allies including Marshal Foch. Was instructor in decorative designing in the College of the City of New York and Cooper Union Woman's Art School. Author: *Decorative Design*, 1915; and *Soldiers All*, 1919.

CHASE, SALMON PORTLAND (1808-1873), American jurist and statesman; b. Cornish, N. H. He graduated at Dartmouth in 1826 and in Dec., 1829, was admitted to the bar in Washington, D. C. A year later he removed to Cincinnati, where he achieved a brilliant reputation and built up a large practice. He early identified himself with the anti-slavery movement and was the leader of the Ohio anti-slavery men from 1837 to 1849. He helped to organize the Liberty and Free Soil parties, and in 1849 was elected to the U. S. Senate. He was governor of Ohio for two terms, 1855-59; was again chosen United States Senator, 1860, and in 1861 entered President Lincoln's Cabinet as Secretary of the Treasury. He resigned in 1864 and in the same year was appointed Chief Justice of the United States Supreme Court, holding the position until his death.

CHASE, SAMUEL (1741-1811), Amer. jurist; opponent of Stamp Act; chief judge of Maryland Court, 1791; later justice of Supreme Court of U.S.A.

CHASE, WILLIAM MERRITT (1849-1916), artist, was b. at Franklin, Ind. He studied painting at the National Academy in New York and later in Europe, where he acquired a purely German method. Returning to New York in 1878, he gradually changed his style in painting, leaning towards that of the French school. He is considered to be one of the most brilliant technicians of the American school, and was equally at home with portraits, figures or still life, being specially noted for his pictures of fish. He is represented in the Metropolitan Museum, New York, the Pennsylvania Academy and the Brooklyn Institute Museum. In 1881 he was appointed instructor of the Brooklyn Art School, and a few years later was elected to the National Academy.

CHASING, the art of ornamenting metals by means of a snarling-iron and other tools.

CHASLES, VICTOR PHILARÈTE (1798-1873), Fr. man of letters; librarian of the Bibliothèque Mazarine; prof. of Lit. in Collège de France; wrote for Eng. reviews and *Revue des deux mondes*, and was the author of many books on literary subjects.

CHASSELOUP-LAUBAT, FRANÇOIS, MARQUIS DE (1754-1833), Fr. military engineer; performed brilliant service in Napoleonic campaigns, and was made general of division; cr. peer and knight of St. Louis by Louis XVIII.

CHASSEPOT, Fr. breech-loading rifle, used 1866-74, invented by A. A. Chassepot, 1833-1905; superseded by the Gras rifle in 1874.

CHASTELARD, PIERRE DE BOSCOCEL DE (1540-63), Fr. poet; page to Marshal Damville, in whose train he accompanied Mary Stewart to Scotland; afterwards entered Mary's service at Holyrood; nourished a passion for the queen, which she is said (with little probability) to have encouraged, but, having twice been discovered hiding in her room, was arrested and hanged.

CHASTELLAIN, GEORGE (d. 1475), Burgundian historian; served in the Anglo-Fr. wars, and later was frequently employed in diplomatic missions between the courts of France and Burgundy. His *Chronique*, which he left in an unfinished MS. state at his death, is invaluable as an authority upon the persons and events of his time.

CHASUBLE, a liturgical vestment, sleeveless, with a hole for the head, of silk or velvet; worn for celebration of Mass. The colors vary according to season, and the shapes are various. The Gothic c. falls in folds over the shoulders and comes to a point both at back and front, while the Roman rests on the shoulders and is rounded back and front. See VESTMENTS.

CHAT, a popular name for birds belonging to the genera *Saxicola* and *Pratincola*, both of which are included in the Turdidae, or thrush family. *S. oenanthe*, the wheatear, *P. rubicola*, the stonechat, and *P. rubetra*, the whinchat, are all birds to which the term is applied. They are lively, insectivorous creatures, dwelling in northern lands and nesting in stony places.

CHÂTEAU, Fr. mediæval name for castle; the town house of the nobility and other distinguished persons being known as hotels, thus, 'Hotel de Guise,' 'Hôtel de Richelieu,' etc.

CHATEAUBRIAND, FRANÇOIS RENÉ, VICOMTE DE (1768-1848), Fr. author; b. St. Malo; ed. Dol and Rennes; served short time as ensign; spent eight months in N. America, 1791, and recorded his impressions in *Voyage en Amérique*. Upon arrest of Louis XVI. he returned to France, and joined army of emigrés; left for dead at Namur, but succeeded in making his way to London. During this period he wrote his famous romance, *Atala*, 1801, dealing with the Indians and prairie life of N. America; and another story, *Rene*, 1802, which established the author's fame as a prose-poet. His other works include *Genie du Christianisme*, 1802, a vindication of the R.C. Church; *Les Martyrs*, 1809, prose epic of the days of Diocletian; *Itinéraire a Jerusalem*, 1811; *Adventures du Dernier des Abencerrages*, 1826; and his posthumous autobiography, *Mémoires d'outre Tombe*.

CHATEAUBRIANT (47° 43' N., 1° 22' W.), town, on Chère, Loire-Inférieure, France; leather. Pop. 5,945.

CHATEAUDUN (48° 5' N., 1° 19' E.), town, Eure-et-Loir, France; manufactures blankets; has mediæval castle, which was originally built in X. cent., and was stronghold of Counts of Dunois. Pop. 5,600.

CHATEAU-GONTIER (47° 50' N., 0° 42' W.), town, Mayenne, France; has linen and woolen manufactures. Pop. 7,100.

CHATEAULIN (48° 12' N., 4° 4' W.), town, Finistère, France. Pop. 4,000.

CHATEAUNEUF, name of eleven towns and villages in France.

CHATEAU-RENAULT, FRANÇOIS LOUIS DE ROUSSELET, MARQUIS DE (1637-1716), Fr. admiral; commanded the Fr. ships at Bantry Bay; in charge of a squadron at Beachy Head, 1690; during the War of the Span. Succession had to convoy the Amer. treasure-ships. His ships were destroyed or captured at Vigo Bay, 1702, by an Eng. fleet under Sir George Rooke.

CHATEAUBOUX (46° 49' N., 1° 42' E.), town, on Indre, France; manufactures of woolen goods, iron, leather, and tobacco. Pop. 25,000.

CHATEAUBOUX, MARIE ANNE, DUCHESSE DE (1717-44), Fr. courtesan; dau. of the Marquis de Nesle; after the death of her husband, the Marquis de la Tournelle, in 1740, she became mistress to Louis XV.

CHATEAU-THIERRY, France, town on the right bank of the Marne, 59 miles

northeast of Paris. Its old castle of Thierry dates back to 730. It has a large wine trade and manufactures musical instruments and woolen yarn. In the Franco-Prussian war it was occupied by the Germans. It became famous in the World War as the place where the thrust of the Crown Prince's army toward Paris was stayed. The achievements of American troops in throwing back the crack divisions of the German army at this point—once in June, 1918, and again on the 15th of July of the same year—have added immortal lustre to American arms. Three days after this last check, Foch made the tremendous counter-attack near Chateau-Thierry that rolled back the enemy in confusion and spelled the doom of the Central Powers.

CHÂTELET, name used in mediæval France for a fort which was not inhabited; also applied to a criminal court abolished in 1790.

CHATELET (50° 25' N., 4° 32' W.), town, on Sambre, Hainault, Belgium; coal and potteries. Pop. 13,000.

CHÂTELLERAULT (46° 49' N., 0° 33' E.), town, Vienne, France; cutlery. Pop. 18,000.

CHATHAM (47° 2' N., 65° 31' W.), town, port of entry, on Miramichi, New Brunswick, Canada; chief industries, lumber trade and fisheries. Pop. 5,000.

CHATHAM (42° 27' N., 82° 20' W.), city, port of entry, on Thames, Ontario, Canada; mills, foundries, and large export trade. Pop. 15,000.

CHATHAM (51° 23' N., 0° 32' E.), town, naval port, on Medway, Kent, England, adjoining Rochester, Brompton, and Gillingham; has important fortifications, and immense dockyards covering over 500 acres, and extending over 3 miles; also great wet docks and graving docks. Pop. 45,000.

CHATHAM ISLANDS (44° 20' S., 176° E.), Brit. group in S. Pacific Ocean, consisting of three islands (*Chatham*, the largest, 38 miles long) and several rocky islets; dependency of New Zealand; total area, 375 sq. miles; coasts rocky; surface hilly, undulating, fertile; discovered by Lieut. Broughton, 1791; inhabitants chiefly Maoris; chief industry is stockrearing, and wool is exported.

CHATHAM, WILLIAM PITT, 1ST EARL OF (1708-78), Brit. statesman; b. Westminster and ed. Eton and Trinity Coll., Oxford. Suffering from ill-health, he traveled abroad, and then entered the army. But in 1735 he became M.P. for Old Sarum and in the Com-

mons vigorously attacked Walpole. In 1746 Pitt became Vice-Treasurer of Ireland, and then Paymaster-General. In 1751 he was dismissed from office for speaking against a government proposal. In 1756, however, he became Sec. of State and Leader of the House. In 1757 he was dismissed, but was reinstated as practical though not nominal head of the Government. The administration of 1757-61 is famous in British history for the successes of Wolfe in Canada and Clive in India, and for the Seven Years War, in which Pitt supported Frederick the Great. He opposed the peace of 1763, but from this time on he was frequently very ill, and unable to take part in public affairs. He retired from office, but came back to form a ministry, he himself being Lord Privy Seal, in 1766. He was then cr. Earl of Chatham. During most of his term of office he was ill, and his conduct was somewhat strange. He resigned in 1768. He appeared in the House of Lords again in 1770, and before his death vigorously opposed the government policy towards America. He was a great orator, and a brilliant if in some ways mysterious personality.

CHATILLON-SUR-SEINE (47° 63' N., 4° 33' E.), town, on Seine, Côte d'Or, France; C. congress between Napoleon and allies, 1814; iron foundries. Pop. 4,900.

CHATSWORTH (55° 24' N., 1° 37' W.), village, Derbyshire, England. C. Hall, seat of Duke of Devonshire, has fine grounds, gardens, library, and art collection; for several years Mary, Queen of Scots, was imprisoned here.

CHATTANOOCHEE, a river in Georgia forming part of the boundary on the west, and joining the Flint, after which it becomes the Appalachian. It is navigable for about 200 m., up to Columbus, the total length being 500 m.

CHATTANOOGA, a city of Tennessee, the county seat of Hamilton co. It is the steamship communication with all the important southern ports. Chattanooga has become in recent years one of the most important industrial cities of the South. Nearby are large deposits of coal, iron, clay and other minerals, and the hydroelectric power generated from the Tennessee and Ocoee rivers provide abundant power for industrial purposes. Plants costing over \$100,000,000 have been built and are run through the water power derived from these rivers. Within the city limits are over 300 factories. The chief industries are the manufactures of lumber, furniture, steel, railroad cars, shovels, and machinery.

The city has many handsome public buildings, including the court-house and Soldiers' and Sailors' Monument Auditorium, Carnegie library, and a terminal station. There is an excellent school system, together with several private schools. The institutions for higher education include the University of Chattanooga, and the Chattanooga School of Law. There are many charitable institutions including an orphans' home, working girls' homes, etc. Chattanooga is the site of a National Soldiers' Cemetery, in which are over 13,000 graves. Here also is the Chattanooga and Chickamauga National Military Park. The city was settled in 1836 as Ross Landing. It was incorporated in 1851. In 1863 it was occupied and nearly destroyed by Union forces. It was the scene of three of the greatest battles of the Civil War, Chickamauga, Missionary Ridge, and Lookout Mountain. Pop. 1920, 57,895; est. 1924, 65,000.

CHATTLE, any kind of property other than freehold.

CHATTERTON, RUTH (1893), born in New York City, educated at Mrs. Hazen's School at Pelham Manor, N.Y. Became an actress and appeared with stock companies until 1912 when she became the leading woman with Henry Miller in *Rainbow*. Later started in many plays among which are: *Daddy Long Legs*, 1914; *Come out of the Kitchen*, 1916; *Moonlight and Honeysuckle*, 1919, and *Mary Rose* in 1920. Also co-starred with Henry Miller in *Marriage of Convenience* in 1918.

CHATTERTON, THOMAS (1752-70), Eng. poet; b. Bristol; posthumous s. of a schoolmaster; ed. Colston's School; apprenticed to a solicitor; was reckoned a dull boy at school, but afterwards developed an intense love for archaic lit. When the new bridge was opened at Bristol, 1768, C. contributed to *Felix Farley's Journal* an alleged description of the opening of the earlier bridge by a XV. cent. monk, Thomas Rowley. Shortly afterwards he entered into correspondence with Horace Walpole, drawing his attention, amongst other matters, to a number of poems by Rowley, which he claimed to have discovered in a muniment chest of the Church of St. Mary Redcliffe. Specimens of these he submitted to Walpole, who at first wrote to him in a most courteous manner, but some of his learned friends, to whom they were submitted, pronounced them to be forgeries. Whereupon ensued a number of bitter letters on the part of C., while Walpole treated the boy with silent

contempt and neglect.

The poet, with a few pounds in his pocket, quitted Bristol for London April, 1770, where he found a precarious employment as a writer of political squibs and songs for Ranelagh Gardens. On August 25, after starving for a week he committed suicide by taking arsenic in his garret at 4 Brook Street, Holborn, and received a pauper's burial.

CHATTI, Ger. tribe, which during the period of the Roman Empire, dwelt in the neighborhood of the river Weser.

CHAUCER, GEOFFREY (c. 1340-1400), the first great Eng. poet; s. of a London vintner. Nothing is known of his early years until, in 1357, he appears as page to the Duchess of Clarence. In 1359 he was following the war in France, and was captured, but ransomed in the following year. Six years later he married Philippa Roet, a lady attending the Duchess of Lancaster. In 1367 he was a valet to the king, and later esquire. Subsequently he again served in the Fr. wars and was frequently employed in diplomatic missions abroad. He was app. Comptroller of the Customs of Wool, Skins, and Leather in 1374; Comptroller of Petty Customs of the Port of London, 1382; and other offices and varying fortunes followed. Thus he occupied a position of honor and substance during the greater portion of his life, and that his work was held in some estimation in his lifetime as evidenced by his burial in Westminster Abbey.

In person the poet was inclined to stoutness, with a fair beard, and a somewhat sly or 'elvish' expression of countenance. His works include *The Book of the Duchess*, *The House of Fame*, *Troilus and Criseyde*, *The Legend of Good Women*, and probably the *Romaunt of the Rose*, and numerous minor works, several of doubtful authorship. The work upon which his fame chiefly rests is *The Canterbury Tales*, begun about 1373, and left incomplete at his death. The various tales are equally remarkable for their lyrical and decorative qualities, the knowledge of life which they display, keen insight into character, playful satire, and joyous humor. Besides an absolute poetic position irrespective of date, C. is important for his influence on language and metre. That English was substituting French in common use is shown by the statute of 1362 that English should be employed in the law courts, but there were many dialects of English and this first great vernacular literature helped to create a central speech. In prosody C. gave an example of the first regular verse, the octosyllabic couplet.

CHAULMUGRA, SEE LEPROSY.

CHAUMETTE, PIERRE GASPARD (1763-94), Fr. revolutionist; member and pres. of Commune, 1792; he attacked the Girondists, 1793; accused by Robespierre and executed, 1794.

CHAUMONT (48° 6' N., 5° 8' E.), town, Haute-Marne, France; gloves. By Treaty of C., 1814, U.K., Austria, Prussia, and Russia agreed to continue war against France. Chaumont was the headquarters of the American Expeditionary Force in France and was the official residence of Gen. Pershing and his staff. Pop. 12,200.

CHAUNCEY, ISAAC (1772-1840), Amer. naval commander, entered U.S.A. navy, 1798; took a prominent part in war of 1812, taking command on Lake Ontario.

CHAUNCEY, CHARLES (1592-1672), Anglican divine; went to America, 1637; pres. of Harvard, 1654; his great-grandson, Charles (1705-87), Amer. divine.

CHAUTAUQUA INSTITUTION, an educational organization whose seat is on Chautauqua Lake in the southwestern part of New York State. At its beginning in 1874 the Chautauqua idea was essentially that of an open air meeting or assembly devoted chiefly to religious study. But it has taken on an infinitely wider character and now embraces almost the whole range of educational subjects. Popular lectures, scientific and philosophical discussions, concerts, literary addresses all come within its scope. There are Schools of English and Modern Languages, of Classical Languages, Mathematics, Sciences, Education, Music, Home Economics, Arts and Crafts, Expression and other subjects. In addition it has an extensive system for home study and reading, carried on individually or in connection with local branches.

CHAUTAUQUA LAKE, a lake in Chautauqua county, New York, 18 mi. long, and about 2 miles wide. It is over 725 feet above Lake Erie, from which it is only 8 miles distant. On its banks is the village of Chautauqua, which is the center of the religious and educational movement known as the Chautauqua Institution (q.v.).

CHAUVELIN, BERNARD FRANÇOIS, MARQUIS DE (1766-1832), Fr. politician; though an aristocrat, and Master of Wardrobe to Louis XVI., took part in the Revolution, and became member of the Council of State under Napoleon.

CHAUVINISM, term used in

Napoleon's days for hero-worship of the emperor; derived from Nicholas Chauvin; exaggerated patriotism, jingoism.

CHAU-DE-FONDS; LA (47° 6' N., 6° 50' E.), town, Neuchâtel, Switzerland; center of watch-making industry. Pop. 40,000.

CHEATHAM, CATHERINE SMILEY (KITTY), an American interpretative singer, b. at Nashville, Tenn., dau. of Col. Richard Boone and Frances Anna Bugg Cheatham. After being educated in public and private schools she later studied in France and took a special course at the University of Berlin. She was widely known as an authoritative on and an interpreter of the literature and songs of childhood and appeared in recitals in leading cities of the United States and Europe. She was a leader of large gatherings in community singing and gave special interpretations of well-known oratorios. Author of: *Kitty Cheatham—Her Book* (musical); *A Nursery Garland*; *America Triumphant Under God and His Christ*.

CHECKERS, Amer. game of draughts.

CHEDDAR (51° 17' N., 2° 47' W.), village, Somersetshire, England; famed for its cliffs and caves; cheese.

CHEDUBA, MAN-AUNG (18° 40' N., 93° 30' E.), island, E. coast, Bay of Bengal, forming part of Arakan; famous for petroleum wells; chief exports, rice; area, 240 sq. miles. Pop. 24,000.

CHEESE, an article of food which is manufactured from the fat and casein of milk. It is separated from the water, sugar, and mineral constituents of the milk by the employment of rennet, a material sold both in a solid and a liquid form and obtained from the fourth stomach of the sucking calf. Rennet possesses the power to coagulate milk which has been heated to the various temperatures employed by the cheesemaker, these varying from 80° to 95° F. After coagulation the curd is cut with great care and precision for the removal of the serum known as whey, which contains the sugar and mineral constituents of the milk. The whole mass is subsequently heated and stirred under given conditions, chiefly for the production of acid from the decomposed sugar. When the requisite acidity is obtained the whey is drawn off and the now solid curd is cut, aerated, and ground in a mill, when it is salted, placed in a vat, and pressed until it has assumed the form of the future cheese.

Cheese may be divided into those which, like Cheddar and Cheshire, are pressed; Stilton and Gorgonzola, which

obolus, to ferry souls of the departed across the Styx to the infernal regions.

CHARPENTIER, GUSTAVE (1860), Fr. composer; b. Alsace-Lorraine; studied violin; best known work, the romantic opera *Louise*; also wrote *Julien*.

CHARPENTIER, FRANÇOIS (1620-1702), Fr. man of letters; pub. *Vie de Socrate*, 1650; trans. Xenophon's *Cyropaedia*, 1658; and other works.

CHART, marine map, showing the nature of the sea floor, with soundings for use of the seafaring population.

CHARTRE CONSTITUTIONELLE, the Magna Carta of France, obtained from Louis XVIII., 1814, and expanded after Revolution, 1830.

CHARRON, PIERRE (1541-1603), Fr. theologian; after studying for law entered the Church, became canon, and was app. preacher in ordinary to Marguerite of Valois. He attacked the League in his *Discours Chrétiens*, 1589; championed Catholicism in *Les Trois Verités*, 1594; while his *De la Sagesse*, 1601, brought down upon him the charge of atheism. He lived on intimate terms with Montaigne.

CHARTER, a written instrument conferring certain privileges, granted by the Crown, the most famous example in Eng. history being Magna Carta given by King John. C's are now chiefly granted to Univ's, corporations, public companies, and similar bodies. The term is also used in the sense of 'to hire,' as to charter a vessel; and was used by Shakespeare in the sense of license ('charter'd libertine').

CHARTERED COMPANIES are trading corporations existing under a charter from a sovereign power, usually for a fixed period, and limited by clearly defined regulations. Such companies existed amongst foreign nations long before they were instituted by Eng. merchants. The Hanseatic League, which maintained its Eng. branch at a place known as the Steel Yard, on the Thames embankment, until the yard was closed by Queen Elizabeth, dates from the XIII. cent. Eng. trading companies came into existence under Elizabeth. The most famous was the East India Company, instituted for the purpose of opening up an Eng. trade with India and the Far East. It received its first charter in 1600, and became the ruling power in India, and it was not until 1858 that its powers were finally absorbed by the Crown.

Second only in importance is the Hudson's Bay Company, which was established in 1670, when Charles II.

granted a charter to Prince Rupert and seventeen other speculators, who were described as 'the Governor and Company of Adventurers of England trading into Hudson's Bay.' Other early companies were the Turkey and Russian Companies, while later institutions have been the National African Co., 1881, which secured the lower Niger for Brit. trade, the Brit. North Borneo Co., 1881; Royal Niger Co., 1886; which enjoyed all rights of government in its territories until they were incorporated with N. and S. Nigeria, 1900; the Imperial Brit. East Africa Co., 1888.

CHARTERHOUSE (Eng. form of *Chartreuse*), famous London school occupying the site of a Carthusian monastery founded by Sir Walter de Manny, 1371. The school itself was founded and endowed under the will of Thomas Sutton, 1532-1611, a London merchant. The number of foundation scholars was at first limited to 40, but has since been increased.

CHARTER OAK, great tree formerly standing in Hartford, Conn., and derived its name from the tradition that a hollow in it formed the hiding-place of the charter of the Connecticut colony, which was placed there to avoid confiscation by Andros, the British governor in 1687. James II., finding the charter in the way of his project to make Connecticut a part of his consolidated New England plan, demanded through Andros its surrender. When the charter was produced in Andros' presence at night, the candles were suddenly extinguished, and when they were relighted the charter had disappeared. When James was overthrown, the charter was again brought from its place of concealment. The oak, which was nearly seven feet in diameter and reputed to be a thousand years old, was blown down in a storm, Aug. 21, 1856. A section of the trunk is preserved in the rooms of the Connecticut Historical Society.

CHARTERS TOWERS (20° 6' S., 146° 6' E.), town Devonport county, Queensland, Australia; gold mines. Pop. 20,000.

CHARTIER, ALAIN (d. 1430), Fr. poet; was sec. to Charles VII.; famous for his poems, *Le Lay des Quatre Dames*, *Debat du reveille-matin*, *La Belle Dame Sans Merci*, etc. A prose work, *Le Curial*, was trans. and pub. by Caxton.

CHARTISM, popular movement demanding, 1838, universal suffrage, vote by ballot, annual parliaments, payment of members, and abolition of property qualification—'The People's Charter.' Parliament refused to receive the pe-

CHARTRES

tion; came to a head in 1848, when a huge procession was massed, by the strategic disposition of troops about London overawed the demonstrators, and the menace passed away.

CHARTRES (48° 26' N., 1° 29' E.), city, Eure-et-Loir, France; formerly capital of Beauce; seat of bp.; cathedral of Notre Dame is one of most magnificent in France; scene of coronation of Henry IV., 1594; obelisk to memory of General Marceau; taken by Germans, 1870; hosiery, leather manufactured. Pop. 19,232.

CHARTREUSE, LA GRANDE, formerly mother house of Carthusians, founded by St. Bruno, 1084. The present building, dating only from XVII. cent., is situated in the mountainous country c. 13 miles N. of Grenoble. The monks were expelled, 1793; returned, 1816; again expelled in 1904, and are now settled at Lucca and Tarragona. The profits from their world-famous liquor have been almost entirely devoted to church-building and benevolent purposes.

CHASE, FREDERICK LINCOLN (1865), b. in Boulder, Colo. Graduated from the University of Colorado in 1886; Ph.D., Yale, 1891. Became assistant in Yale observatory in 1890, was asst. astronomer 1891 to 1911, and acting director from 1910 to 1913. Author: *Heliometer Triangulation of the Victoria Comparison Stars* (annals of the Cape Obs., 1897); *Triangulation of the Principal Stars of the Cluster in Coma Berenices* (trans. Yale University Obs., vol. 1, part. V, 1896); *Parallax Investigations on 163 Stars mainly of Large Proper Motion* (trans. Yale Obs., Vol. 2, Part 1, 1906); *Parallax Investigations on 35 Selected Stars*, Vol. 2, part 2, 1910); *Parallax of 41 Southern Stars*, Vol. 2, part 3, 1912; *Catalogue of Yale Parallax Results*, Vol. 2, part 4, 1912 and miscellaneous papers in Astron. Journal.

CHASE, GEORGE (1849), b. in Portland, Me. Graduated (valedictorian) from Yale in 1870; LL.B., Columbia University Law School, 1873. Was admitted to the New York bar in 1873. Was instructor and assistant professor in municipal law, 1873-8, and professor in criminal law, torts and procedure from 1878-91 at Columbia University. In 1891 became dean in New York Law School. Was author of Chase's edition of *Blackstone's Commentaries for American Students*; *Stephen's Digest of the Law of Evidence and Chase's Cases on Torts*. Was also assistant editor of Johnson's Universal Encyclopedia.

CHASE, JOSEPH CUMMINGS

CHASE

(1878), b. in Kents Hill, Me. Studied art at Pratt Institute, N. Y., Pennsylvania Academy of Fine Arts and Académie Julien, Paris, under Jean Paul Laurens. Exhibited in Paris Salon. In 1904 won first and second prizes in the Grunwaldt poster competition. Was a portrait painter and during the World War painted at the front, in all 142 portraits of officers of the A.E.F., including General Pershing and staff. Also did portraits of many 'doughboys' who had been cited for extraordinary heroism and several officers of the Allies including Marshal Foch. Was instructor in decorative designing in the College of the City of New York and Cooper Union Woman's Art School. Author: *Decorative Design*, 1915; and *Soldiers All*, 1919.

CHASE, SALMON PORTLAND (1808-1873), American jurist and statesman; b. Cornish, N. H. He graduated at Dartmouth in 1826 and in Dec., 1829, was admitted to the bar in Washington, D. C. A year later he removed to Cincinnati, where he achieved a brilliant reputation and built up a large practice. He early identified himself with the anti-slavery movement and was the leader of the Ohio anti-slavery men from 1837 to 1849. He helped to organize the Liberty and Free Soil parties, and in 1849 was elected to the U. S. Senate. He was governor of Ohio for two terms, 1855-59; was again chosen United States Senator, 1860, and in 1861 entered President Lincoln's Cabinet as Secretary of the Treasury. He resigned in 1864 and in the same year was appointed Chief Justice of the United States Supreme Court, holding the position until his death.

CHASE, SAMUEL (1741-1811), Amer. jurist; opponent of Stamp Act; chief judge of Maryland Court, 1791; later justice of Supreme Court of U.S.A.

CHASE, WILLIAM MERRITT (1849-1916), artist, was b. at Franklin, Ind. He studied painting at the National Academy in New York and later in Europe, where he acquired a purely German method. Returning to New York in 1878, he gradually changed his style in painting, leaning towards that of the French school. He is considered to be one of the most brilliant technicians of the American school, and was equally at home with portraits, figures or still life, being specially noted for his pictures of fish. He is represented in the Metropolitan Museum, New York, the Pennsylvania Academy and the Brooklyn Institute Museum. In 1881 he was appointed instructor of the Brooklyn Art School, and a few years later was elected to the National Academy.

CHASING, the art of ornamenting metals by means of a snarling-iron and other tools.

CHASLES, VICTOR PHILARÈTE (1798-1873), Fr. man of letters; librarian of the Bibliothèque Mazarine; prof. of Lit. in Collège de France; wrote for Eng. reviews and *Revue des deux mondes*, and was the author of many books on literary subjects.

CHASSELOUP-LAUBAT, FRANÇOIS, MARQUIS DE (1754-1833), Fr. military engineer; performed brilliant service in Napoleonic campaigns, and was made general of division; cr. peer and knight of St. Louis by Louis XVIII.

CHASSEPOT, Fr. breech-loading rifle, used 1866-74, invented by A. A. Chassepot, 1833-1905; superseded by the Gras rifle in 1874.

CHASTELARD, PIERRE DE BOSCOCEL DE (1540-63), Fr. poet; page to Marshal Danville, in whose train he accompanied Mary Stewart to Scotland; afterwards entered Mary's service at Holyrood; nourished a passion for the queen, which she is said (with little probability) to have encouraged, but, having twice been discovered hiding in her room, was arrested and hanged.

CHASTELLAIN, GEORGE (d. 1475), Burgundian historian; served in the Anglo-Fr. wars, and later was frequently employed in diplomatic missions between the courts of France and Burgundy. His *Chronique*, which he left in an unfinished MS. state at his death, is invaluable as an authority upon the persons and events of his time.

CHASUBLE, a liturgical vestment, sleeveless, with a hole for the head, of silk or velvet; worn for celebration of Mass. The colors vary according to season, and the shapes are various. The Gothic c. falls in folds over the shoulders and comes to a point both at back and front, while the Roman rests on the shoulders and is rounded back and front. See **VESTMENTS**.

CHAT, a popular name for birds belonging to the genera *Saxicola* and *Pratincola*, both of which are included in the Turdidae, or thrush family. *S. oenanthe*, the wheatear, *P. rubicola*, the stonechat, and *P. rubetra*, the whinchat, are all birds to which the term is applied. They are lively, insectivorous creatures, dwelling in northern lands and nesting in stony places.

CHÂTEAU, Fr. mediæval name for castle; the town house of the nobility and other distinguished persons being known as hotels, thus, 'Hotel de Guise,' 'Hôtel de Richelleu,' etc.

CHATEAUBRIAND, FRANÇOIS RENÉ, VICOMTE DE (1768-1848), Fr. author; b. St. Malo; ed. Dol and Rennes; served short time as ensign; spent eight months in N. America, 1791, and recorded his impressions in *Voyage en Amérique*. Upon arrest of Louis XVI. he returned to France, and joined army of emigrés; left for dead at Namur, but succeeded in making his way to London. During this period he wrote his famous romance, *Atala*, 1801, dealing with the Indians and prairie life of N. America; and another story, *Rene*, 1802, which established the author's fame as a prose-poet. His other works include *Genie du Christianisme*, 1802, a vindication of the R.C. Church; *Les Martyrs*, 1809, prose epic of the days of Diocletian; *Itinéraire a Jerusalem*, 1811; *Adventures du Dernier des Abencerages*, 1826; and his posthumous autobiography, *Mémoires d'outre Tombe*.

CHÂTEAUBRIANT (47° 43' N., 1° 22' W.), town, on Chère, Loire-Inférieure, France; leather. Pop. 5,945.

CHÂTEAUDUN (48° 5' N., 1° 19' E.), town, Eure-et-Loir, France; manufactures blankets; has mediæval castle, which was originally built in X. cent., and was stronghold of Counts of Dunois. Pop. 5,600.

CHÂTEAU-GONTIER (47° 50' N., 0° 42' W.), town, Mayenne, France; has linen and woolen manufactures. Pop. 7,100.

CHÂTEAULIN (48° 12' N., 4° 4' W.), town, Finistère, France. Pop. 4,000.

CHATEAUNEUF, name of eleven towns and villages in France.

CHÂTEAU-RENAULT, FRANÇOIS LOUIS DE ROUSSELET, MARQUIS DE (1637-1716), Fr. admiral; commanded the Fr. ships at Bantry Bay; in charge of a squadron at Beachy Head, 1690; during the War of the Span. Succession had to convoy the Amer. treasure-ships. His ships were destroyed or captured at Vigo Bay, 1702, by an Eng. fleet under Sir George Rooke.

CHÂTEAUBOUX (46° 49' N., 1° 42' E.), town, on Indre, France; manufactures of woolen goods, iron, leather, and tobacco. Pop. 25,000.

CHÂTEAUBOUX, MARIE ANNE, DUCHESSE DE (1717-44), Fr. courtesan; dau. of the Marquis de Nesle; after the death of her husband, the Marquis de la Tournelle, in 1740, she became mistress to Louis XV.

CHATEAU-THIERRY, France, town on the right bank of the Marne, 59 miles

northeast of Paris. Its old castle of Thierry dates back to 730. It has a large wine trade and manufactures musical instruments and woolen yarn. In the Franco-Prussian war it was occupied by the Germans. It became famous in the World War as the place where the thrust of the Crown Prince's army toward Paris was stayed. The achievements of American troops in throwing back the crack divisions of the German army at this point—once in June, 1918, and again on the 15th of July of the same year—have added immortal lustre to American arms. Three days after this last check, Foch made the tremendous counter-attack near Chateau-Thierry that rolled back the enemy in confusion and spelled the doom of the Central Powers.

CHÂTELET, name used in mediæval France for a fort which was not inhabited; also applied to a criminal court abolished in 1790.

CHÂTELET (50° 25' N., 4° 32' W.), town, on Sambre, Hainault, Belgium; coal and potteries. Pop. 13,000.

CHÂTELLERAULT (46° 49' N., 0° 33' E.), town, Vienne, France; cutlery. Pop. 18,000.

CHATHAM (47° 2' N., 65° 31' W.), town, port of entry, on Miramichi, New Brunswick, Canada; chief industries, lumber trade and fisheries. Pop. 5,000.

CHATHAM (42° 27' N., 82° 20' W.), city, port of entry, on Thames, Ontario, Canada; mills, foundries, and large export trade. Pop. 15,000.

CHATHAM (51° 23' N., 0° 32' E.), town, naval port, on Medway, Kent, England, adjoining Rochester, Brompton, and Gillingham; has important fortifications, and immense dockyards covering over 500 acres, and extending over 3 miles; also great wet docks and graving docks. Pop. 45,000.

CHATHAM ISLANDS (44° 20' S., 176° E.), Brit. group in S. Pacific Ocean, consisting of three islands (*Chatham*, the largest, 38 miles long) and several rocky islets; dependency of New Zealand; total area, 375 sq. miles; coasts rocky; surface hilly, undulating, fertile; discovered by Lieut. Broughton, 1791; inhabitants chiefly Maoris; chief industry is stockrearing, and wool is exported.

CHATHAM, WILLIAM PITT, 1ST EARL OF (1708-78), Brit. statesman; b. Westminster and ed. Eton and Trinity Coll., Oxford. Suffering from ill-health, he traveled abroad, and then entered the army. But in 1735 he became M.P. for Old Sarum and in the Com-

mons vigorously attacked Walpole. In 1746 Pitt became Vice-Treasurer of Ireland, and then Paymaster-General. In 1751 he was dismissed from office for speaking against a government proposal. In 1756, however, he became Sec. of State and Leader of the House. In 1757 he was dismissed, but was reinstated as practical though not nominal head of the Government. The administration of 1757-61 is famous in British history for the successes of Wolfe in Canada and Clive in India, and for the Seven Years War, in which Pitt supported Frederick the Great. He opposed the peace of 1763, but from this time on he was frequently very ill, and unable to take part in public affairs. He retired from office, but came back to form a ministry, he himself being Lord Privy Seal, in 1766. He was then cr. Earl of Chatham. During most of his term of office he was ill, and his conduct was somewhat strange. He resigned in 1768. He appeared in the House of Lords again in 1770, and before his death vigorously opposed the government policy towards America. He was a great orator, and a brilliant if in some ways mysterious personality.

CHATILLON-SUR-SEINE (47° 63' N., 4° 33' E.), town, on Seine, Côte d'Or, France; C. congress between Napoleon and allies, 1814; iron foundries. Pop. 4,900.

CHATSWORTH (55° 24' N., 1° 37' W.), village, Derbyshire, England. C. Hall, seat of Duke of Devonshire, has fine grounds, gardens, library, and art collection; for several years Mary, Queen of Scots, was imprisoned here.

CHATTAHOOCHEE, a river in Georgia forming part of the boundary on the west, and joining the Flint, after which it becomes the Appalachian. It is navigable for about 200 m., up to Columbus, the total length being 500 m.

CHATTANOOGA, a city of Tennessee, the county seat of Hamilton co. It is the steamship communication with all the important southern ports. Chattanooga has become in recent years one of the most important industrial cities of the South. Nearby are large deposits of coal, iron, clay and other minerals, and the hydroelectric power generated from the Tennessee and Ocee rivers provide abundant power for industrial purposes. Plants costing over \$100,000,000 have been built and are run through the water power derived from these rivers. Within the city limits are over 300 factories. The chief industries are the manufactures of lumber, furniture, steel, railroad cars, shovels, and machinery.

The city has many handsome public buildings, including the court-house and Soldiers' and Sailors' Monument Auditorium, Carnegie library, and a terminal station. There is an excellent school system, together with several private schools. The institutions for higher education include the University of Chattanooga, and the Chattanooga School of Law. There are many charitable institutions including an orphans' home, working girls' homes, etc. Chattanooga is the site of a National Soldiers' Cemetery, in which are over 13,000 graves. Here also is the Chattanooga and Chickamauga National Military Park. The city was settled in 1836 as Ross Landing. It was incorporated in 1851. In 1863 it was occupied and nearly destroyed by Union forces. It was the scene of three of the greatest battles of the Civil War, Chickamauga, Missionary Ridge, and Lookout Mountain. Pop. 1920, 57,895; est. 1924, 65,000.

CHATEL, any kind of property other than freehold.

CHATTERTON, RUTH (1893), born in New York City, educated at Mrs. Hazen's School at Pelham Manor, N.Y. Became an actress and appeared with stock companies until 1912 when she became the leading woman with Henry Miller in *Rainbow*. Later started in many plays among which are: *Daddy Long Legs*, 1914; *Come out of the Kitchen*, 1916; *Moonlight and Honeysuckle*, 1919, and *Mary Rose* in 1920. Also co-starred with Henry Miller in *Marriage of Convenience* in 1918.

CHATTERTON, THOMAS (1752-70), Eng. poet; b. Bristol; posthumous s. of a schoolmaster; ed. Colston's School; apprenticed to a solicitor; was reckoned a dull boy at school, but afterwards developed an intense love for archaic lit. When the new bridge was opened at Bristol, 1768, C. contributed to *Felix Farley's Journal* an alleged description of the opening of the earlier bridge by a XV. cent. monk, Thomas Rowley. Shortly afterwards he entered into correspondence with Horace Walpole, drawing his attention, amongst other matters, to a number of poems by Rowley, which he claimed to have discovered in a muniment chest of the Church of St. Mary Redcliffe. Specimens of these he submitted to Walpole, who at first wrote to him in a most courteous manner, but some of his learned friends, to whom they were submitted, pronounced them to be forgeries. Whereupon ensued a number of bitter letters on the part of C., while Walpole treated the boy with silent

contempt and neglect.

The poet, with a few pounds in his pocket, quitted Bristol for London April, 1770, where he found a precarious employment as a writer of political squibs and songs for Ranelagh Gardens. On August 25, after starving for a week he committed suicide by taking arsenic in his garret at 4 Brook Street, Holborn, and received a pauper's burial.

CHATTI, Ger. tribe, which during the period of the Roman Empire, dwelt in the neighborhood of the river Weser.

CHAUCER, GEOFFREY (c. 1340-1400), the first great Eng. poet; s. of a London vintner. Nothing is known of his early years until, in 1357, he appears as page to the Duchess of Clarence. In 1359 he was following the war in France, and was captured, but ransomed in the following year. Six years later he married Philippa Roet, a lady attending the Duchess of Lancaster. In 1367 he was a valet to the king, and later esquire. Subsequently he again served in the Fr. wars and was frequently employed in diplomatic missions abroad. He was app. Comptroller of the Customs of Wool, Skins, and Leather in 1374; Comptroller of Petty Customs of the Port of London, 1382; and other offices and varying fortunes followed. Thus he occupied a position of honor and substance during the greater portion of his life, and that his work was held in some estimation in his lifetime as evidenced by his burial in Westminster Abbey.

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CHAULMUGRA, SEE **LEPROSY**.

CHAUMETTE, PIERRE GASPARD (1763-94), Fr. revolutionist; member and pres. of Commune, 1792; he attacked the Girondists, 1793; accused by Robespierre and executed, 1794.

CHAUMONT (48° 6' N., 5° 8' E.), town, Haute-Marne, France; gloves. By Treaty of C., 1814, U.K., Austria, Prussia, and Russia agreed to continue war against France. Chaumont was the headquarters of the American Expeditionary Force in France and was the official residence of Gen. Pershing and his staff. Pop. 12,200.

CHAUNCEY, ISAAC (1772-1840), Amer. naval commander, entered U.S.A. navy, 1798; took a prominent part in war of 1812, taking command on Lake Ontario.

CHAUNCY, CHARLES (1592-1672), Anglican divine; went to America, 1637; pres. of Harvard, 1654; his great-grandson, Charles (1705-87), Amer. divine.

CHAUTAUQUA INSTITUTION, an educational organization whose seat is on Chautauqua Lake in the southwestern part of New York State. At its beginning in 1874 the Chautauqua idea was essentially that of an open air meeting or assembly devoted chiefly to religious study. But it has taken on an infinitely wider character and now embraces almost the whole range of educational subjects. Popular lectures, scientific and philosophical discussions, concerts, literary addresses all come within its scope. There are Schools of English and Modern Languages, of Classical Languages, Mathematics, Sciences, Education, Music, Home Economics, Arts and Crafts, Expression and other subjects. In addition it has an extensive system for home study and reading, carried on individually or in connection with local branches.

CHAUTAUQUA LAKE, a lake in Chautauqua county, New York, 18 mi. long, and about 2 miles wide. It is over 725 feet above Lake Erie, from which it is only 8 miles distant. On its banks is the village of Chautauqua, which is the center of the religious and educational movement known as the Chautauqua Institution (*q.v.*).

CHAUVELIN, BERNARD FRANÇOIS, MARQUIS DE (1766-1832), Fr. politician; though an aristocrat, and Master of Wardrobe to Louis XVI., took part in the Revolution, and became member of the Council of State under Napoleon.

CHAUVINISM, term used in

Napoleon's days for hero-worship of the emperor; derived from Nicholas Chauvin; exaggerated patriotism, jingoism.

CHAU-DE-FONDS; LA (47° 6' N., 6° 50' E.), town, Neuchâtel, Switzerland; center of watch-making industry. Pop. 40,000.

CHEATHAM, CATHERINE SMILEY (KITTY), an American interpretative singer, b. at Nashville, Tenn., dau. of Col. Richard Boone and Frances Anna Bugg Cheatham. After being educated in public and private schools she later studied in France and took a special course at the University of Berlin. She was widely known as an authoritative on and an interpreter of the literature and songs of childhood and appeared in recitals in leading cities of the United States and Europe. She was a leader of large gatherings in community singing and gave special interpretations of well-known oratorios. Author of: *Kitty Cheatham—Her Book* (musical); *A Nursery Garland*; *America Triumphant Under God and His Christ*.

CHECKERS, Amer. game of draughts.

CHEDDAR (51° 17' N., 2° 47' W.), village, Somersetshire, England; famed for its cliffs and caves; cheese.

CHEDUBA, MAN-AUNG (18° 40' N., 93° 30' E.), island, E. coast, Bay of Bengal, forming part of Arakan; famous for petroleum wells; chief exports, rice; area, 240 sq. miles. Pop. 24,000.

CHEESE, an article of food which is manufactured from the fat and casein of milk. It is separated from the water, sugar, and mineral constituents of the milk by the employment of rennet, a material sold both in a solid and a liquid form and obtained from the fourth stomach of the sucking calf. Rennet possesses the power to coagulate milk which has been heated to the various temperatures employed by the cheesemaker, these varying from 80° to 95° F. After coagulation the curd is cut with great care and precision for the removal of the serum known as whey, which contains the sugar and mineral constituents of the milk. The whole mass is subsequently heated and stirred under given conditions, chiefly for the production of acid from the decomposed sugar. When the requisite acidity is obtained the whey is drawn off and the now solid curd is cut, aerated, and ground in a mill, when it is salted, placed in a vat, and pressed until it has assumed the form of the future cheese.

Cheese may be divided into those which, like Cheddar and Cheshire, are pressed; Stilton and Gorgonzola, which

are blue veined and not pressed; and Brie, Coulommiers, and Camembert, which are soft curd—ripened or unripened. Among well-known foreign types of cheese are Gruyère (French and Swiss), Parmesan (Italian), Gouda and Edam (Dutch), all of which are pressed varieties. The staple cheese made in the United States is the so-called 'American' cheese. It is mild and varies little in flavor. Foreign cheeses of all kinds are largely imported into the United States. In addition, in the United States, immense quantities of cheese are made in imitation of all the various European kinds. The home made cheeses include sour and skimmed milk, cream, sweet milk, etc.

CHEETAH, HUNTING LEOPARD (*Cynoeur s jubatus*), animal of the cat family; claws not retractile; body covered with small black spots; occurs in Africa, Persia, India, where it has been trained for hunting antelopes and other game.

CHEE-KIANG (29° N., 120° E.), E. province, China, bordering Pacific Ocean; hilly, fertile; tea and silk chief exports; principal cities, Hang-chow and Ning-po; area, 36,670 sq. miles. Pop. c. 12,000,000.

CHELSEA, city of Suffolk co., Mass., and close to Boston, with which it is connected by a network of ferries, trolley lines and railroads. It is chiefly a manufacturing town, with large industries of iron and steel, pottery, leather, cordage, foundry and machine shop products and rubber goods. There are two national banks and other banking institutions. Daily and weekly newspapers and excellent church and educational facilities. The town was settled in 1624 and was incorporated as a city in 1857. Pop. 43,184; 1924 (est.), 47,000.

CHELSEA, W. district, London, Eng.; on N. bank of Thames, communicating with Battersea by three bridges; residence of numerous celebrities, including Sir Thomas More, Katherine Parr, Walpole, Swift, Leigh Hunt, Carlyle, Turner, Rossetti, Whistler; formerly famous for porcelain; most notable building is C. Royal Hospital, for invalid soldiers, designed by Wren, built 1682-90. Pop. 1921, 63,700.

CHELTHENHAM (51° 55' N., 2° 5' W.), watering-place and market town, on Chelt, Gloucestershire, England; mineral springs discovered, 1716; has medicinal baths, winter gardens, public parks; among notable educational institutions are grammar school, founded 1576; Cheltenham Coll. for boys, founded 1842; Ladies Coll.; two training colleges for teachers, and many private

schools. Pop. 1921, 48,444.

CHEL'YABINSK, TCHEL'YABINSK (55° 20' N., 61° 15' E.), town, Orenburg, Russia. Pop. 62,000.

CHEMICAL AFFINITY. See AFFINITY, CHEMICAL.

CHEMICAL ENGINEERING, occupies an intermediate position between chemistry and mechanical engineering, and it is the function of the chemical engineer to co-operate with the two other sciences in transferring to a manufacturing basis the laboratory results obtained by the research chemist. It is a common occurrence for a laboratory chemist with little or no knowledge of engineering to work out a process of manufacture which is theoretically perfect, but which can never be commercially valuable either because large scale apparatus for carrying out the process cannot be designed, or because it is intrinsically uneconomical. There are in existence today many processes which give, in the laboratory, high yields of excellent and valuable products, yet they have never been exploited commercially owing to the impossibility of constructing equipment which will withstand the corrosive chemicals employed, or because of some similar difficulty of an engineering character. On the other hand, few mechanical engineers possess the specific information needed for designing chemical plants, which involves a familiarity with the corrosive action of different groups of chemicals upon metals of all kinds, together with a wide knowledge of the physical and chemical properties of the commoner reagents employed in manufacture. In the laboratory, apparatus is constructed of glass or porcelain, which, in the first place, is practically non-corrosive, and in the second place has no effect upon the reactions carried out in contact with it. On the large scale the use of glass or porcelain is, almost without exception, utterly impracticable, and the equipment must be constructed of metals, concrete, wood, brick or other common building materials. Difficulties immediately arise. All the commoner building materials are readily corroded or disintegrated by many acids and other chemicals. Moreover, some of the metals have a marked effect upon reactions taking place in contact with them—sometimes beneficial, more often detrimental. For instance, in the manufacture of chlorobenzene, the use of an iron vessel assists the process to take place smoothly and rapidly. On the other hand, in a similar process, the manufacture of benzal chloride, the smallest trace of iron is detrimental. A single example of this

kind is sufficient to indicate the special knowledge needed by the chemical engineer.

Moreover, in the laboratory, where materials are handled in small quantities, the cost of water and fuel is apt to be ignored by the research worker. When, however, tons of material are handled in place of grams, the cost of water, steam and fuel are important items, and countless processes which have appeared, to the laboratory worker, to be practical, have been shown, on investigation from the engineering standpoint, to be commercially worthless, solely because the cost of fuel, steam and water has made them unprofitable.

The chemical engineer, therefore, must in the first place be familiar with the properties of materials, with special reference to their resistance to chemical action. He must have a knowledge of the approved methods of transporting liquids, solids and gases, and of the commoner mechanical processes pertaining to chemical manufacture, including crushing, filtration, screening, leaching, concentration, drying and crystallization. He must be able to handle measuring instruments of all kinds—pyrometers, pressure gauges, flow meters and electrical meters of every description. Finally, he must have a sufficient knowledge of chemistry to be able to discuss intelligently, with the research chemist the details of a manufacturing process, and of engineering design to be able to convey to the mechanical engineer the requirements of the chemist in a language which the engineer can understand.

CHEMICAL SOCIETY, AMERICAN, an organization founded in April, 1876, for the advancement of chemistry and promotion of physical research. It has eight divisions and forty-nine sections and is the largest society of its kind in the world. The eight divisions are Physical and Inorganic Chemistry, Fertilizer Chemistry, Agricultural and Food Chemistry, Organic Chemistry, Biological Chemistry, Industrial and Engineering Chemistry, Pharmaceutical Chemistry and Water, Sewage and Sanitation. Its membership in 1923 was 15,000.

CHEMICAL WARFARE. From the time when bows and arrows and similar weapons were replaced by firearms and the use of explosives the chemist has played an important role in the preparation of munitions of war. In fact, even in early times the use of chemicals for destroying or discomfiting the enemy was common, burning sulphur and similar materials being used in the 'stink pots' of the ancients. In its strictest sense, however, the term 'chemical warfare'

covers the use of poisonous or irritating gases and the means of defense used against them, and the practice in its modern development dates from April 22nd, 1915, when the Germans first used chlorine in an attack upon the French Front, north of the Ypres salient.

The chemical warfare division of an army is divided, to a more definite degree than other divisions, into an Offense Section and a Defense Section. It is the function of the former to devise gases which shall be more deadly, and against which it shall be more difficult to provide protection, than those used by the enemy. It also comes within the duties of this section to develop and supervise the wholesale manufacture of the gas which it considers satisfactory, to carry out large scale tests of its toxicity and general usefulness, and to devise containers which will not be corroded by the gas. The Defense Section is chiefly concerned with providing the fighting units with protection against gas attacks. The commonest and most successful form of defense so far devised is the gas mask. This usually consists of a hood fitting loosely over the head and so devised that the air drawn into the body in the act of breathing has to pass through a canister filled with activated absorbent carbon and neutralizing chemicals. To increase the efficiency of this protection it is obviously necessary to collect samples of the gases used by the enemy, to analyze them and on the basis of such analyses to prepare chemicals which shall neutralize or absorb the gases satisfactorily. The manufacture of such chemicals and of the absorptive carbon also form part of the functions of the Defense Section.

A 'war gas' may be a liquid, a solid, a vapor or a true gas. Its value may depend either on its toxic properties, its power to produce tears, or nausea, or sneezing, its foul odor, or its capacity for forming a dense smoke. Gases having all these different properties were used in the European war. The gas must be effective in very small concentration, no gas being considered satisfactory which cannot produce the desired results in a concentration of one part per million of air. In the early days of the European war, the cloud attack was commonly used, the gases being liberated from tanks, or cylinders, and carried over to the enemy trenches by favorable winds. Such methods, however, were too uncertain in their results, and in the later years of the war gas was sent over in special shells and the use of cloud attacks was almost completely abandoned.

CHEMISTRY is that branch of science

which deals with the composition of matter and the changes in molecular structure which it is capable of undergoing. It should be noted that this definition excludes purely physical changes; such, for instance, as the change from water to ice, or from water to steam. It is clear that no fundamental alteration has been brought about in the molecular structure by thus changing its physical condition, because both ice and steam can readily be converted into water again, the former by melting, the latter by condensation. If, however, sugar is dissolved in the water and is then caused to ferment, a fundamental change takes place in the sugar molecule. A gas (carbon dioxide) and alcohol are produced and the sugar, as such, disappears, and cannot readily be formed again. The melting of ice and the boiling of water are physical changes. The fermentation of sugar is a chemical change. It is not always so easy to distinguish between the two, as there are numerous phenomena on the borderline between physical and chemical. In fact, the more profound the study of physics and chemistry the more are the two sciences found to converge. Nevertheless, they form two separate branches of study, and while it is true that every chemical change is accompanied by physical change, many physical changes occur which involve no change in chemical structure.

History. The science of chemistry, especially in its practical application, is of very ancient origin. The civilizations of Egypt, Phœnicia, Greece and Rome were skilled in metallurgy, and successfully extracted many metals from their ores and manufactured alloys of copper, lead and tin. They were familiar with the tanning of leather, the fermentation of wine and beer, and the manufacture of soap, glass, pottery and starch. Ancient records reveal the fact that between 700 and 800 A.D., arsenic, borax, alum, sulphate of iron, sodium chloride, and some of the commoner acids were known to Arabian chemists. For about nine hundred years, the science developed, in the hands of the alchemists, into a search for the philosopher's stone and the attempt to convert base metals into gold. The work of the alchemists was not entirely valueless, but their labors were misdirected, and it was not until the middle of the seventeenth century that Robert Boyle succeeded in turning chemical investigations into more scientific channels. Then came the phlogiston theory of combustion, formulated by Becher and Stahl, who maintained that a substance which they name phlogiston was contained in all combustible matter, and that burning consisted in the escape

of this substance. Boyle demonstrated however, that many substances when burnt increased in weight—lead, for instance, which, as we now know, forms the oxide by the addition of oxygen from the air. This phenomenon was explained by the theory that phlogiston had 'negative weight,' so that when lead lost its phlogiston it became heavier. This fantastic theory was finally disproved by Lavoisier, who shared with Priestley and Scheele the discovery of oxygen in the air. These three chemists, together with Marggraf, Cavendish, Richter, and others laid the foundations of modern chemistry, and were followed by Berthollet, who studied chemical affinity, and Dalton who formulated the famous atomic theory. Dalton was born in 1766 and died in 1844, and other great chemists of the same period were Gay-Lussac, Dulong, Wollaston, Davy and Berzelius. The last named confirmed the law of constant proportion (see below), formulated the electrochemical theory of the constitution of salts, and determined many atomic weights. The connecting link between inorganic and organic chemistry was forged in 1828, when Wohler prepared urea from ammonium cyanate. The work begun by these scientists has been carried on by a host of distinguished chemists, far too numerous to mention by name, until we possess today a far-reaching knowledge of the constitution of matter, not only of our own world but of distant celestial bodies, while the application of chemical discoveries to industry has reached such proportions that it has been truly said that modern existence is more dependent upon chemistry than upon any other science.

Constitution of Matter. According to modern conceptions, all matter is, in its final analysis, essentially the same in constitution. All matter, solid, liquid or gaseous, is composed of minute particles called *molecules*. The molecules are built up of *atoms*, and the atoms consist of particles of positive and negative electric ty. The simplest atom, that of hydrogen, is a particle of negative electricity revolving around a nucleus of positive electricity. The particle of negative electricity is called an *electron* and the nucleus is called a *proton*. Regardless of the substance from which they are derived, all electrons are found to be the same, and it is now believed that the variation in the nature and properties of the elements depends solely upon the number of electrons contained in their atoms and the manner in which they are arranged around the positive nucleus. It is conceivable, therefore, that all matter was evolved from a single element, that element

being hydrogen, although recent researches seem to indicate that there are two basic elements—hydrogen and helium, and that the other elements may be divided into two groups, one being derived from hydrogen and the other from helium.

Compounds and Mixtures. Although the recent discoveries outlined above have considerably modified the chemist's conception of matter, they have by no means condemned the fundamentals of the science nor the chemical laws formulated by the great men of the eighteenth and nineteenth centuries. The first step in the proper comprehension of these laws is a full understanding of the difference between a compound and a mixture. A substance which always has exactly the same composition, regardless of the method by which it is produced, is considered to be a chemical compound. On the other hand, a substance which varies in composition according to the manufacturer, is a mixture. For instance, white paint may consist of lead carbonate, zinc oxide, whiting, lead oxide, linseed oil and turpentine. But one manufacturer may omit the whiting altogether, and another may leave out the zinc oxide, while a dozen others may use all six constituents but may mix them in different proportions. Yet all the different products may rightly be called white paint, which is, therefore, a mixture. But pure common salt, (sodium chloride) whether it comes from sea water or is dug from the ground, or is manufactured in the laboratory, will always consist of sodium and chlorine combined in exactly the same proportions. Similarly, alcohol, whether made by fermenting molasses, malt or grape-juice, will always consist of carbon, hydrogen and oxygen combined in exactly the same proportions. Moreover, a chemical compound is homogeneous throughout its mass; a mixture is not necessarily so. A teaspoonful of salt from the top of a package is identical with a teaspoonful of salt from the bottom; a brushful of paint from the top of a can is seldom the same as a brushful from the bottom. The constituents of a compound can never be separated by mechanical means; the constituents of a mixture frequently can. This leads us to the first great chemical law.

The Law of Constant Proportions. *The same compound always contains the same elements combined together in the same proportion by weight.* In view of what has been said above, this law is easy to understand. The second great law which was first observed by Dalton is equally simple. It frequently happens that the same elements combine in more than

one proportion, giving rise to two or more distinct compounds. Each compound obeys the law of constant proportions, because each will always contain the same proportion by weight of the composing elements. But the important fact which Dalton discovered was that when one element unites with another in more than one proportion, these different proportions bear a simple ratio to one another. To make this clear let us take a simple example. Nitrogen and oxygen unite to form five different compounds. In the first of the series, the proportion of nitrogen to oxygen, by weight, is 14 to 8, in the second 14 to 16, in the third 14 to 24, in the fourth 14 to 32, in the fifth 14 to 40. Now if we examine the weights of oxygen in the various compounds which combine with fourteen parts of nitrogen, we observe that they are all multiples of 8. In other words, the ratio which they bear to one another is 1 : 2 : 3 : 4 : 5. Innumerable similar examples could be given. The second great law is therefore:

The Law of Multiple Proportions. *When one element unites with another in more than one proportion, these different proportions bear a simple ratio to one another.*

Now let us suppose that various elements combine with some other element, taken as a standard, and that by analyzing the compounds thus produced the weights of these elements which combine with a definite weight of the standard are determined. For instance, let us take oxygen as our standard, and calcium, sulphur and hydrogen as our other elements. When these three elements combine with oxygen, they do so in proportions of 8 parts of oxygen to 20 of calcium, 8 of sulphur and 1 of hydrogen. Now suppose that these three elements combine, one with another. Will the proportions in which they combine with one another bear any relation to the proportions in which they combine with the same weight of oxygen? Yes, they will. For instance, hydrogen combines with sulphur in the proportion of 1 to 16—which is twice 8. Calcium combines with sulphur in the proportion of 20 to 16. When calcium and hydrogen occur in the same compound they exist in the proportion of 20 of calcium to 1 of hydrogen. In this case, therefore, we see that the weights of calcium, sulphur and hydrogen which combined with oxygen are either the same as, or simple submultiples of, the weights of the three elements which combined with one another. An overwhelming mass of evidence goes to prove that a similar relation always exists, no matter what elements are under consideration. The third great

law is therefore:

The Law of Equivalent Proportions. The weights of different elements which combine separately with the same weight of another element are either the same as, or are simple multiples of, the weight of these different elements which combine with one another.

The Atomic Theory. Although at the time of the discovery of radium there was much loose talk about the breakdown of Dalton's theory of the atom, the theory, in its essentials, remains today as fully established as ever, and is accepted by chemists almost in the form in which it was first definitely put forward. More has been learnt regarding the structure of the atom, but belief in its existence has by no means been abandoned. The theory, in brief, is that matter is built up of atoms, and that these are the smallest particles of matter which can take part in a chemical reaction; that atoms of the same element are similar to one another and equal in weight; that atoms of different elements are dissimilar; that compounds are formed by the union of atoms of different elements in simple numerical proportions; and that the combining weights of the elements bear a simple relation to the combining weights of the atoms. The theory is generally attributed to Dalton, but in its simplest form it was held by ancient philosophers and by many great thinkers in more recent times. Dalton in 1803 revived the theory, and elaborated it on a definite scientific foundation.

Chemical Nomenclature. The names given to the eighty-two known elements have been chosen for various reasons. Some are of Greek origin and describe the more obvious properties they possess, such as chlorine, because of its green color, chromium, because its salts are colored, and so on; some are named after the localities where they are found, such as ruthenium, from Ruthenia, ytterbium from Ytterby; others are named capriciously, such as uranium, in honor of the discovery of the planet Uranus, victorium, after Queen Victoria. Compounds are named according to the elements from which they are formed. Compounds of an element with oxygen are called oxides, with sulphur are called sulphides, with chlorine, chlorides and so on. When an element forms more than one oxide, a Greek suffix is used to indicate the number of atoms of oxygen with which it combines; thus, sulphur dioxide, sulphur trioxide, lead monoxide, phosphorus pentoxide, and so on. Oxides which combine with water to form acids are known as anhydrides, and the compounds of metals with acids are called salts. Thus, common salt is the

salt of the metal sodium with hydrochloric acid, and is known as sodium chloride, Epsom salt is the salt of the metal magnesium with sulphuric acid and is known as magnesium sulphate.

Symbols. In order to represent an element, one or two letters are used from the name of the element. Thus O represents oxygen, H hydrogen, S sulphur, N nitrogen, P phosphorus, C carbon, Cl chlorine, Ca calcium. Some elements receive symbols from their Latin names; thus Pb is lead (Lat. *plumbum*), Au is gold (Lat. *aurum*), Cu is copper (Lat. *cuprum*), Na is sodium (Lat. *natrium*). The symbol of a compound shows the number of atoms which go to form its molecule; NaCl is sodium chloride, because the molecule contains one atom each of sodium and chlorine; H₂O is water, because the molecule contains two atoms of hydrogen and one of oxygen. H₂SO₄ is sulphuric acid, because the molecule contains two atoms of hydrogen, one of sulphur and four of oxygen.

Organic and Inorganic Chemistry. The science is divided into two great branches—organic and inorganic. The former is a study of the compounds of carbon, including sugar, starch, fats, proteins, and the huge group of derivatives from benzene, including the so-called aniline dyes. The latter covers the study of all purely mineral substances.

CHEMISTRY, AGRICULTURAL.

See AGRICULTURAL CHEMISTRY.

CHEMISTRY, ANIMAL. See BIO-CHEMISTRY.

CHEMISTRY, INDUSTRIAL. There scarcely exists today any industry of importance which does not depend, to a greater or lesser degree, upon chemical control. This is true, not only of those industries directly engaged in the manufacture of dyes and other chemicals, but of other manufacturing processes whose connection with chemistry would appear to be remote. Most modern factories of appreciable size keep a close control over their fuel consumption and employ chemists to analyze their coal and coke, and also the flue gases from their furnaces, in order, firstly, to keep a check upon the quality of their fuel and, secondly, to provide their engineers with data which will enable them to obtain the greatest possible efficiency combined with economy in fuel consumption. Similarly, the analysis of boiler water, and the treatment of water to prevent scale, or the softening of water for scouring operations, all come under the control of the factory chemist. In large plants where much

machinery is used, lubrication becomes a matter of extreme importance, and a systematic testing of oils and greases is found to be true economy. In all industries where raw materials are purchased and converted into other products systematic analyses of both raw materials and finished products are, today, almost a necessity, partly to guard against fraud, and partly to ensure a standard product. Among the industries which consist almost wholly of applied chemistry, the great metallurgical processes, including the manufacture of all the different grades of iron and steel, are, perhaps, the most important. The manufacture of explosives, dyes and synthetic perfumes, the distillation of mineral oil, and the extraction and refining of vegetable and other edible oils are all wholly dependent upon chemical control for their successful operation. In the manufacture of paper from wood, the chemist supervises the preparation of the acid or alkali used for cooking the wood; he determines the quantity of hypochlorite required for bleaching the pulp; he adjusts the percentage of rosin to give the desired degree of sizing, and of mineral filler to give weight, and finally, he tests the finished paper for color, strength, opacity and other properties. The sugar industry, from the extraction of the juice from cane or beet, to the preparation of granulated sugar or the various syrups which form the industry's by-products, is wholly dependent on the chemist, and the same may be said regarding the manufacture of soaps, inks, paints, leather, cement and a host of food products of every description. Not only is the scientific control of these industries in the hands of chemists, but their growth has been almost entirely due to chemical discoveries, and the progress of the older industries as well as the birth of the new, are largely, if not entirely, the outcome of research work carried on in innumerable chemical laboratories all over the world.

CHEMNITZ (50° 50' N., 12° 55' E.), town, on Chemnitz, Saxony, Germany; one of leading industrial commercial centers; has important locomotive and engineering works; manufactures cottons and woollens. Pop. 1919, 303,775.

CHEMNITZ, MARTIN (1522-86), Lutheran divine; lecturer at Wittenberg; then pastor at Brunswick; wrote against Calvinism and helped to maintain dogmatic standards in Lutheranism.

CHEMOTAXIS (biol.), the reaction of bacteria, protozoa, and zoospores of Algae with chemical substances (carbon dioxide, acids, alkalis) in solution, being

either attractive (positive c.) or repellent (negative c.). The term chemotropism is applied to the sensitive movement of certain plant organs either towards or from a chemical stimulus.

CHEMULPO (37° 24' N., 126° 37' W.), town, W. coast of Korea; scene of first naval battle of Russo-Jap. War, 1904; treaty port opened, 1883. Pop. 25,000.

CHENAB (30° 50' N., 71° 54' E.); one of the 'five rivers,' of Punjab, India; rises in Kashmir range, N.W. Himalayas, and joins Jhelum at Tammu; ancient *Acesines*.

CHEOPS (Gr. form of *Khu'fu*), an Egyptian king; founder of the 4th dynasty; he was the builder of the first or Great Pyramid; date, according to some, 3969-3908 B.C.

CHEQUE, written order on a banker, signed by a person having an account with the bank; also spelled 'check.'

CHER (47° N., 2° 30' E.), department, Central France; formed part of old province, Berry; chief rivers, Cher and Loire; surface generally flat; fertile; extensive pastures, fine timber; coal and iron mines; grain, porcelain; area, 2,819 sq. miles. Pop. 335,000.

CHERBOURG (49° 38' N., 1° 37' W.), fortified town and seaport, Manche, France, at mouth of Divette on north coast of peninsula Contentin; roadstead protected from north by magnificent breakwater over two miles in length; has extensive docks and arsenal; but C.'s chief importance is derived from its naval and commercial harbors; chief industries, shipbuilding, rope-making, tanning, etc.; dairy and poultry produce Cherbourg was an important Naval Station during the World War. It is the headquarters of one of the three maritime arrondissements into which France is divided. Pop. 50,000.

CHERBULIEZ, CHARLES VICTOR (1829-99), Fr. novelist and essayist; belonged to Swiss family distinguished as scholars.

CHERCHEL (36° 33' N., 2° 10' E.); seaport, N. coast Algeria; agricultural wine-growing center; has extensive ruins of former cities; ancient *Caesarea*. Pop. 9,000.

CHERCHEN, oasis and town, Eastern Turkistan.

CHERIBON, TJERIBON (6° 55' S., 118° 26' E.), town, N. coast, island of Java, Dutch East Indies; sugar, coffee, and rice chief products. Pop. 52,000.

CHERKASY (49° 26' N., 32° 8' E.),

town, on Dnieper, Kiev, Russia. Pop. 30,000.

CHERNIGOV, TCHERINGOV (51° 40' N., 32° E.), government, Little Russia, traversed by Dnieper and Desna; cereals and tobacco chief products; area, 20,232 sq. miles. Pop. 2,900,000.

CHERNIGOV (51° 29' N., 31° 19' E.), town, on Desna, Russia; capital of C. government; abb.'s seat; XI-cent. cathedral. Pop. 30,000.

CHEROKEE INDIANS, originally one of the largest and most important tribes. In early American history they were found along the Allegheny and Appalachian ranges from Virginia to Alabama, but later on emigrated to Louisiana and Indian Territory. They sided with the British in the Revolutionary war but did good service to the United States in the War of 1812. They have attained perhaps a greater degree of culture and civilization than any other tribe of American Indians. They have large tribal properties in Oklahoma.

CHERRAPUNJI (25° 15' N., 91° 45' E.), village, Kashi Hills district, Assam; has heaviest known rainfall in world; average, c. 500 in. per annum.

CHERRY, trees and shrubs with serrate leaves and white blossoms belonging to the plum genus (*Prunus*), and derived from two species, the wild or dwarf c. (*Prunus cerasus*) and the gean (*Prunus avium*). Many varieties are cultivated for the red fleshy fruit containing a kernel. The c. is used for eating and in the preparation of the liquors, kirschwasser, ratafia, and maraschino, and the kernel of the perfumed c. (*P. mahaleb*) is used in perfumery and confectionery. Cherry wood is employed by cabinetmakers and in the manufacture of tobacco pipes, walking-sticks, etc.

CHERRY VALLEY, summer resort, New York State; scene of massacre by Indians, 1778; has sulphur springs.

CHERSONESE (Gk. *Chersonesos*, peninsula), name used specially of 'Thracian Chersonese,' now called the Crimea; it was colonized by the Gks. in V. cent. B.C.; the city of *Cherson* (conquered by the Romans) was of commercial importance in the later empire, and lasted till the XIV. cent.

CHERTSEY (51° 24' N., 0° 30' W.), market town, Surrey, England; remains of Benedictine abbey (founded VII. cent.); agricultural produce. Pop. 13,000.

CHERUBIM (Hebr. plural of *Cherub*); celestial spirits mentioned in Old Testament; usually represented as winged

children. Bacon states that in celestial hierarchy the c., angels of light, come next in order to the seraphim, angels of love.

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CHESTER-LE-STREET (54° 52' N., 1° 35' W.), town, Durham, England, collieries, ironworks. Pop. 15,000.

CHESTERTON (52° 18' N., 0°), village, on Cam, forming N.E. suburb of Cambridge, England; boat-building and tile manufacture.

CHESTERTON, GILBERT KEITH (1874) Eng. author; has written on Dickens, Browning, Bernard Shaw, etc., and novels, poems, and miscellaneous works; a journalist of distinction, art and literary critic, brilliant satirist, paradoxical writer, and lecturer. He visited the United States in 1921.

CHESTNUT (*Castanea saliva*), large tree of the order *Fagaceae*, with large serrated lanceolate leaves and yellowish catkin. The timber is somewhat like oak, and used for gate posts, etc., while the fruit, chestnuts, ground to a meal and made into a porridge, are roasted or boiled as a vegetable, or candied or preserved (*marrons glacés, crème de marrons*). The tree is a native of Mediterranean countries, and an allied species, *C. americana*, occurs in N. America.

The horse-chestnut (*Aesculus hippocastanum*), a beautiful tree, is frequently planted in avenues, on account of its large foliage and 'candelabra' of white or red flowers. The wood is soft, and used as fuel, for making charcoal, and common carpentry. Three seeds or nuts are enclosed in one capsule, and are used or feeding stock, and for the manufacture of a burning oil.

CHETTLER, HENRY (1865-1907), Eng. dramatist and satirist; wrote *Jane Shore*, *Hofmann*, *The Blind Beggar of Bethnal Green*; also satires.

CHEVALIER, MICHEL (1806-79), Fr. economist; prof. in the Coll. de France; helped to bring Britain and France into better commercial relations; wrote economic works.

CHEVAUX-DE-FRISE, military device, first used in the Dutch War of Independence, consisting of planks in which swords and spikes were fixed, to impede cavalry.

CHEVERUS, JEAN LOUIS ANNE MAGDALINE LEFEBVRE (1768-1836), Fr. divine; went to America, 1796; bp. of Boston, 1808; back in France, 1823; abp. of Bordeaux, 1826.

CHEVIOT HILLS (55° 18' N., 2° 30' W.), range of hills forming border between England and Scotland, extending 35 miles N.E. to S.W.; highest point, 2,676 ft.; numerous ruins and border 'peels'; famed for valuable breed of sheep.

CHEVRON, a figure shaped thus A forming the highest part of the framework of a house; a similar figure upon a

heraldic shield; a badge of rank, or good conduct, in the military, naval, and other services.

CHEVROTAIN, MOUSE-DEER, tiny, hornless, slightly deer-like, artiodactylous mammals, family Tragulidae, comprising several species in tropical Asia, W. and E. Central Africa.

CHEVY CHASE, famous ballad on the combat between the Douglas and Lord Percy of Northumberland at the battle of Otterburn, 1388. Two forms are found in Percy's *Reliques*.

CHEYENNE, capital city of Wyoming, situated 110 miles north of Denver on the Burlington, Colorado and Southern and Union Pacific railroads. It was founded in 1867 in close proximity to Fort D. A. Russell. It is the seat of the repair shops of the Union Pacific railroad, and has important coal, iron and oil deposits in the vicinity and is the center of a large cattle raising and sheep growing region. It has gas plants, electric light works and a municipally-owned water system. It has broad streets and boulevards, banks, libraries, newspapers, churches, schools and many handsome public buildings, including the State Capitol. Cheyenne became the capital of Wyoming in 1869. It is administered under the commission form of government. Pop. 13,829.

CHEYENNES, Indians forming a branch of the Algonquin stock formerly inhabiting the basin of the Winnipeg river and lake. Before the advance of the whites they migrated southward, part of the tribe settling in the Black Hills region of South Dakota and others in Colorado. They were in almost constant conflict with the whites, their last warfare resulting in a crushing defeat inflicted on them by Custer in 1868. They now number about 3,000 and are settled on reservations in Montana and Oklahoma.

CHHATTISGARH (c. 21° 20' N., 82° E.), S.E. division, Central Provinces, India, comprising districts of Riapur, Bilaspur, and Drug. Area, 21,240 sq. miles. Pop. 2,650,000.

CHHINDWARA (22° 3' N., 79° E.), town and district, Nerbudda division, Central Provinces, India; cotton cloth. Area, 4,631 sq. miles. Pop. 407,927. Pop., town, 9736.

CHIANA (42° 50' N., 12° 7' E.), river, Tuscany, Italy; conducted by canals into Arno and Tiber; ancient Clanis; originally tributary of Tiber.

CHIAPAS (16° 25' N., 93° W.), Pacific state, Mexico, W. of Guatemala;

CHICAGO

mountainous; immense forests; maize, sugar; capital, Tuxtla Gutierrez. Area, 27,230 sq. miles. Pop. 440,000.

CHICAGO, a city of Illinois, second city in the Union in point of population, situated in Cook county on the southwestern shore of Lake Michigan. It has an area of 201.28 square miles. The land is low and flat, having an average elevation of only 25 feet above Lake Michigan.

The beginning of the city settlement dates back to 1777 when a San Domingo negro settled there as an Indian trader. He sold his house in 1803 to John Kinzie, the first American settler. In 1804, a stockade with two block houses was built and named Fort Dearborn. It had a garrison of one company of infantry and stood on a reservation of six square miles, ceded by the Indians to the United States in 1795. In the War of 1812 the fort was captured, and the entire garrison together with women and children was massacred. The fort was reconstructed in 1816 and about it rose a small village which has grown into the present Chicago. The growth of the city, though slow at first, finally became very rapid, and its area was enlarged by successive annexations. In 1837 the city had 4,479 residents. The census of 1920 gave it 2,701,705; 1923, 2,886,871.

The city is incorporated under the general laws of the state. It is governed by a mayor and city council, the latter body consisting of fifty members. The city's debt in 1923 was \$62,331,670. Its assessed realty valuation was \$3,415,635,240. The water works system which has cost over \$70,000,000 is owned by the city. There are 3,400 miles of streets and 1,800 miles of alleys, apart from the many miles of parkways and boulevards under the supervision of the various park boards. The city is served by 39 railroads, including 24 trunk lines which terminate there. It has enormous business interests, chief of which are meat packing, agricultural implement works, iron and steel manufactures. It is by far the greatest stock-yard and packing center in the world. Its elevator warehouses have a capacity of over 50,000,000 bushels of grain. The situation of the city on Lake Michigan gives it a vast commerce through the Great Lakes.

Municipal appropriations for all purposes in 1922 amounted to \$138,076,688.97. The value of manufactures was \$3,658,740,000. Bank clearings in 1921 were \$25,974,692,957. In the city and suburbs there were 226 national and state banks. Newspapers and periodicals numbered 820. The city has 1,397 churches, chapels and missions, 300 public schools, 65 libraries and 137

CHICAGO, UNIVERSITY OF

asylums. There are 657,679 homes and the public schools have 452,257 pupils.

A terrible fire in 1871 swept the greater part of Chicago from the earth. An area of 2,024 acres was burned over, and the value of the property destroyed was valued at over \$187,000,000. About 300 people are believed to have lost their lives in the disaster. The undaunted spirit of her citizens, however, arose to the emergency, and in a little over two years the burned area was covered with more solid and handsome buildings than those that had been destroyed. In a sense the fire was a blessing, since it marked the beginning of a new and more prosperous era for the city.

In 1892 the Columbia Exposition was held in Chicago, an area of 666 acres in Jackson Park with a frontage of two miles on Lake Michigan being laid aside for that purpose. The entire cost of the fair was estimated upward of \$43,000,000, and the whole number of admissions during its progress was 27,529,401.

CHICAGO HEIGHTS, a city of Illinois, in Cook co., 26 miles south of Chicago. It is on the Chicago and Eastern Illinois, the Michigan Central, and other railroads. It is an important industrial community and has manufactures of iron and steel goods, chemicals, glass, carriages, automobiles, and railroad cars. There is a library and a hospital among its public buildings. Pop. 1920, 19,653.

CHICAGO RIVER, navigable stream in Illinois that divides the city of Chicago into three parts. It has two branches that unite at a mile from Lake Michigan, into which it formerly emptied. It was found, however, that the sewage carried into the lake (from which the people of Chicago draw their water supply) was affecting the public health, and a plan was devised of cutting a canal between the south branch of the river and the Desplain s river, with a pumping plant that would change the direction of the current and make it flow into the Illinois river system. This was effected Jan. 2, 1900. The river, though crooked and difficult of navigation because of the bridges spanning it, carries a large volume of commerce.

CHICAGO, UNIVERSITY OF, one of the largest educational institutions in the United States, located at Chicago, Ill. It was founded under Baptist auspices in 1890 and open to students in 1892. The rapid growth of the university has been due largely to the gifts of Mr. John D. Rockefeller, who has given "more

CHERNIGOV

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CHEST, oblong wood or metal box. Formerly a more important article of furniture than now, it was emblazoned and otherwise decorated; it was used for the storage of household requisites and valuables.

CHESTER, city, cap. Cheshire, Eng. (53° 12' N., 2° 52' W.), on Dee; canal port, great railway center; surrounded by anc. walls; has old Gothic cathedral dedicated to St. Werburgh, 11th cent. Other important buildings are bishop's palace and church of St. John (7th cent.), both outside walls; Bluecoat school, founded 1700; grammar school founded by Henry VIII.; modern castle (built 1786) on site of old building, which dated from William the Conqueror's reign; many old timbered houses of 16th cent.; Gothic town hall, free library, museum, market hall; several public parks; race course ('Roodee'); ironworks, brewing; manufactures cheese, leather, gloves, boots, shoes. Chester was an important station (Deva) under Romans, of whom traces remain; site of mint in Middle Ages; taken by Roundheads, 1645, after three months siege. Pop. 1921, 40,794.

CHESTER, a city of Pennsylvania in Delaware co., on the Delaware River, 15 miles S. of Philadelphia. It is excellently served by the Baltimore and Ohio, the Philadelphia and Reading and the Philadelphia, Wilmington and Baltimore railroads. It has large ship-building plants and a great diversity of industries, including foundries, machine shops, woolen and cotton mills. There are several national banks, two hospitals, a public library and many educational institutions, of which the most prominent are Pennsylvania Military College and Crozier Theological Seminary while Swarthmore College is located near the city. The city was settled by the Swedes in 1643 and is the oldest city in the state. It was incorporated in 1866

and adopted the commission form of government in 1913. Pop. 58,030.

CHESTER, COLBY MITCHEL (1844), a rear admiral of the U.S. Navy, b. at New London, Conn., s. of Melville and Frances E. Harris Chester. He graduated from the U.S. Naval Academy in 1863 and served through the remaining years of the Civil War on the Richmond with the West Gulf Blockading Squadron and participated in the battle of Mobile Bay and the capture of Fort Morgan, 1864, also in the capture of Mobile in 1865. He afterwards served on various duties and stations including the command of several U.S. ships and after advancing through various ranks was made rear admiral in 1903. He retired in 1906 and from then until 1908 was on special duty in the Bureau of Equipment and in Europe. He received valuable concessions of territory from the Turkish Government in 1923. *SEE TURKEY.*

CHESTER, GEORGE RANDOLPH (1869), author, was b. in Ohio. He left home in his early youth, and after various occupations, he began newspaper work as a reporter on the staff of the Cincinnati Enquirer, ultimately becoming Sunday editor of the latter. He has written extensively for newspaper syndicates and for the magazines. He is the author of the successful story, *Get-Rich-Quick-Wallingford*, and of numerous books and short stories.

CHESTERFIELD (53° 14' N., 1° 26' W.), market town, Derbyshire, England; Gothic church of All Saints and St. Mary contains ancient monuments, and has remarkable twisted spire, 230 ft. high; Trinity Church is burial place of George Stephenson; industries include iron- and brass-founding, and manufactures of cotton and silk. Pop. 1921, 61,236.

CHESTERFIELD, PHILIP DORMER STANHOPE, 4TH EARL OF (1694-1773), Eng. statesman and author; s. of Philip, 3rd earl; M.P. for St. Germans, 1715; became earl, 1726; went as ambassador to The Hague, 1728; Lord-Lieutenant of Ireland, 1744, and ruled with firmness and moderation; Sec. of State, 1746-48; he then retired. His *Letters to his Son*, (i.e.), his natural s., Philip, he having no children by his wife, Melusina, natural dau. of George I., are the best literary production of the age of Walpole. They are frank to impropriety, and cynical, but a compendium of wisdom and craft.

CHESTER-LE-STREET (54° 52' N.; 1° 35' W.), town, Durham, England, collieries, ironworks. Pop. 15,000.

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than \$40,000,000. The university includes Schools of Science, Divinity, Law, Technology, Fine Arts, Music, Literature, Commerce and Administration. There are in addition several academies and secondary schools that are under the university's control. Women are admitted to all departments of the university. There are more than 40 buildings on the campus. The assets of the university, including grounds and buildings, exceed \$42,000,000, and the endowment is \$29,000,000. The current expenditures are more than \$2,000,000 annually. Many books, pamphlets and periodicals are published by the University Press. The number of students in 1923 was 11,335 and there were 355 members of the teaching staff.

CHICKAHOMINY, a riv. of Virginia. It is a trib. of the James R., which it joins 22 m. below City Point. In 1862 the battles of Fair Oaks, Mechanicsville, Gaine's Mill, Savage's Station, White Oak Swamp, and in 1864 Cold Harbor, took place near the river.

CHICKAMAUGA CREEK, a river which takes its rise in Walker co., Georgia, and flows into the Tennessee 6 m. above Chattanooga. The Confederates under Bragg defeated the Federals under Rosecrans in Sept. 1863 on the banks of the river.

CHICKASHA, a town of Oklahoma, in Grady co., of which it is the county seat. It is on the Chicago, Rock Island and Pacific, the Oklahoma Central, and other railroads, and on the Washita river. It is an important industrial city and has machine shops and flour mills. It is the site of the State College for Women. Pop. 1920, 10,179.

CHICLE, a product of the fruit of the sapodilla tree, which grows in Brazil and the West Indies. The fruit resembles a Bergamot pear in shape and size. From it is obtained an elastic gum which is extensively used in the manufacture of chewing gum.

CHICOPEE, a city of Massachusetts, in Hampden co. It is on the Boston and Maine railroad, and on the Connecticut and Chicopee rivers, 3 miles north of Springfield. It includes three villages. Chicopee has important industries which derive water power from Chicopee Falls. Its manufactures include athletic goods, automobile tires, automobiles, cotton goods, machine tools, etc. Its public institutions include a high school and a public library. It is connected with the surrounding towns by electric railway lines. Pop. 1920, 36,214; 1923, 40,111.

CHICORY (*Chichorium intybus*), per-

ennial plant (order Compositæ) with bright blue flowers occurring on the north temperate zone chiefly on chalky soils. Its leaves are used as a salad, and the roots are dried, roasted, ground, and decocted as a substitute for, or addition to coffee.

CHICOUTIMI, chief town, Chicoutimi co., Quebec, Canada (48° 24' N., 71° 4' W.), 100 m. N. of Quebec city; college, sailors' hospital, R.C. cathedral; lumber center. Pop. 5,900.

CHIDAMBARAM (c. 11° 24' N., 79° 44' E.), town, South Arcot, district Madras, India; sacred temples. Pop. 20,000.

CHIEMSEE (47° 56' N., 12° 25' E.), largest lake, Bavaria; length 8½ miles.

CHIENG-MAI (18° 50' N., 99° 2' E.), town, on Me-ping, Chieng-Mai, N. Siam; center of teak trade. Pop. c. 100,000.

CHIERI (45° 1' N., 7° 49' E.), town, Turin, Italy; ancient Caerea; Gothic cathedral, silks. Pop. 12,500.

CHIETI (42° 21' N., 14° 10' E.), city (and province), Italy; abp.'s seat; cathedral; woolen and cottons manufactured. Pop. 26,000.

CHI-FU, CHEFOO (37° 31' N., 121° 25' E.), seaport, N. coast, province, Shantung, China; coaling station. The Chefoo Convention, 1876, between Britain and China, gave to Britain certain commercial rights, threw open for treaty ports, and promised protection to foreigners in China. Pop. 50,000-100,000.

CHIH-LI, PE-CHI-LI (c. 38° 30' N., 115° E.), N.E. province, China, bordering Gulf of Chih-li on east; forms immense plain watered by Pei-ho, Hunho, and Lan-ho; mountainous N. and W.; contains Peking, capital of China; coal, iron, and silver found; cereals and cotton produced. Area, 120,500 sq. miles. Pop. 25,000,000.

CHIHUAHUA (29° N., 106° W.), state, Mexico; hot, dry climate; in east large tracts are devoid of vegetation; traversed in west by Sierra Madre, which form fruitful valleys of good pasture. C. is rich in minerals, gold and silver mining being principal industry. Area, 87,828 sq. miles. Pop. 405,000.

CHIHUAHUA (28° 32' N., 106° 15' W.), city, capital of C. state, Mexico; chief occupation, mining; manufacture of cottons and woollens. Pop. 40,000.

CHILAS (35° 25' N., 74° 16' E.), fort, on Indus, N.W. Frontier Provinces, India.

CHILBLAINS, irritating inflammation of the skin, usually at the fingers

('chapped hands') or toes; caused by cold in those whose circulation or general nutrition is deficient; treatment is to apply iodine or ichthyol to affected part, and take tonics, (e.g.) strychnine of iron, internally.

CHILD, EDWIN BURRAGE, b. Gouverneur, N. Y. Graduated from Amherst college in 1890 and studied art at the Art Students League, New York, in 1891. Was also a pupil of John LaFarge whom he assisted in glass work and mural painting for several years. Was a contributor to magazines and illustrated many articles in Scribner's and other periodicals. Later became engaged chiefly in portrait painting. Exhibited regularly in the Nat. Acad. Design. Society of American Artists and other important annual exhibitions.

CHILD, FRANCIS JAMES (1825-1896), scholar and educator, was b. in Boston. He was Boylston professor of rhetoric and oratory at Harvard, later exchanging this post for that of professor of English literature. He was the first authority in the United States on English and Scotch ballads and folk-songs, his work on this subject running to ten volumes.

CHILD, LYDIA MARIA (1802-80), Amer. author and slavery abolitionist.

CHILD, RICHARD WASHBURN (1881), American author and diplomat; b. Worcester, Mass. He graduated from Harvard in 1903, received the degree of LL.B. from that institution in 1906, and in the same year was admitted to the bar. His tastes, however, ran to literature, and he wrote a number of novels that achieved wide popularity. During the World War he was assistant to F. A. Vanderlip in the War Finance work of the United States Treasury Department. In 1919 he became editor of Collier's Weekly. He was appointed Ambassador to Italy by President Harding in 1922 succeeding Thomas Nelson Page.

At the opening of the conference on Near East problems at Lausanne, Switzerland, in 1922, Ambassador Child was directed by the President to act as the American observer at the conference. There his services as mediator and conciliator between the Turkish and Allied delegates were of notable value. On behalf of the United States he set forth the disapproval of this country of the main feature of the Allied plan namely: the setting up of an International Straits Commission. He strongly backed the argument of the Allies for the protection of the Christian minorities declaring that humanitarian interests were as much America's right

and duty as those of any other nation.

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His publications include *Jim Hands*, 1910; *The Man in the Shadow*, 1911; *The Blue Wall*, 1912; *Potential Russia*, 1916; *Bodbank*, 1916; *Vanishing Man*, 1919; *Velvet Black*, 1920; and the *Hands of Nora*, 1921. He also contributed many articles to magazines.

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CHICKAHOMINY

than \$40,000,000. The university includes Schools of Science, Divinity, Law, Technology, Fine Arts, Music, Literature, Commerce and Administration. There are in addition several academies and secondary schools that are under the university's control. Women are admitted to all departments of the university. There are more than 40 buildings on the campus. The assets of the university, including grounds and buildings, exceed \$42,000,000, and the endowment is \$29,000,000. The current expenditures are more than \$2,000,000 annually. Many books, pamphlets and periodicals are published by the University Press. The number of students in 1923 was 11,335 and there were 355 members of the teaching staff.

CHICKAHOMINY, a riv. of Virginia. It is a trib. of the James R., which it joins 22 m. below City Point. In 1862 the battles of Fair Oaks, Mechanicsville, Gaines's Mill, Savage's Station, White Oak Swamp, and in 1864 Cold Harbor, took place near the river.

CHICKAMAUGA CREEK, a river which takes its rise in Walker co., Georgia, and flows into the Tennessee 6 m. above Chattanooga. The Confederates under Bragg defeated the Federals under Rosecrans in Sept. 1863 on the banks of the river.

CHICKASHA, a town of Oklahoma, in Grady co., of which it is the county seat. It is on the Chicago, Rock Island and Pacific, the Oklahoma Central, and other railroads, and on the Washita river. It is an important industrial city and has machine shops and flour mills. It is the site of the State College for Women. Pop. 1920, 10,179.

CHICLE, a product of the fruit of the sapodilla tree, which grows in Brazil and the West Indies. The fruit resembles a Bergamot pear in shape and size. From it is obtained an elastic gum which is extensively used in the manufacture of chewing gum.

CHICOPEE, a city of Massachusetts, in Hampden co. It is on the Boston and Maine railroad, and on the Connecticut and Chicopee rivers, 3 miles north of Springfield. It includes three villages. Chicopee has important industries which derive water power from Chicopee Falls. Its manufactures include athletic goods, automobile tires, automobiles, cotton goods, machine tools, etc. Its public institutions include a high school and a public library. It is connected with the surrounding towns by electric railway lines. Pop. 1920, 36,214; 1923, 40,111.

CHICORY (*Chichorium intybus*), per-

CHILBLAINS

ennial plant (order Compositæ) with bright blue flowers occurring on the north temperate zone chiefly on chalky soils. Its leaves are used as a salad, and the roots are dried, roasted, ground, and decocted as a substitute for, or addition to coffee.

CHICOUTIMI, chief town, Chicoutimi co., Quebec, Canada (48° 24' N., 71° 4' W.), 100 m. N. of Quebec city; college, sailors' hospital, R.C. cathedral; lumber center. Pop. 5,900.

CHIDAMBARAM (c. 11° 24' N., 79° 44' E.), town, South Arcot, district Madras, India; sacred temples. Pop. 20,000.

CHIEMSEE (47° 56' N., 12° 25' E.), largest lake, Bavaria; length 8½ miles.

CHIENG-MAI (18° 50' N., 99° 2' E.), town, on Me-ping, Chieng-Mai, N. Siam; center of teak trade. Pop. c. 100,000.

CHIERI (45° 1' N., 7° 49' E.), town, Turin, Italy; ancient Caerea; Gothic cathedral, silks. Pop. 12,500.

CHIETI (42° 21' N., 14° 10' E.), city (and province), Italy; abp.'s seat; cathedral; woolen and cottons manufactured. Pop. 26,000.

CHI-FU, CHEFOO (37° 31' N., 121° 25' E.), seaport, N. coast, province, Shantung, China; coaling station. The Chefoo Convention, 1876, between Britain and China, gave to Britain certain commercial rights, threw open for treaty ports, and promised protection to foreigners in China. Pop. 50,000-100,000.

CHIH-LI, PE-CHI-LI (c. 38° 30' N., 115° E.), N.E. province, China, bordering Gulf of Chih-li on east; forms immense plain watered by Pei-ho, Hunho, and Lan-ho; mountainous N. and W.; contains Peking, capital of China; coal, iron, and silver found; cereals and cotton produced. Area, 120,500 sq. miles. Pop. 25,000,000.

CHIHUAHUA (29° N., 106° W.), state, Mexico; hot, dry climate; in east large tracts are devoid of vegetation; traversed in west by Sierra Madre, which form fruitful valleys of good pasture. C. is rich in minerals, gold and silver mining being principal industry. Area, 87,828 sq. miles. Pop. 405,000.

CHIHUAHUA (28° 32' N., 106° 15' W.), city, capital of C. state, Mexico; chief occupation, mining; manufacture of cottons and woollens. Pop. 40,000.

CHILAS (35° 25' N., 74° 16' E.), fort, on Indus, N.W. Frontier Provinces, India.

CHILBLAINS, irritating inflammation of the skin, usually at the fingers

('chapped hands') or toes; caused by cold in those whose circulation or general nutrition is deficient; treatment is to apply iodine or ichthyol to affected part, and take tonics, (e.g.) strychnine of iron, internally.

CHILD, EDWIN BURRAGE, b. Gouverneur, N. Y. Graduated from Amherst college in 1890 and studied art at the Art Students League, New York, in 1891. Was also a pupil of John LaFarge whom he assisted in glass work and mural painting for several years. Was a contributor to magazines and illustrated many articles in Scribner's and other periodicals. Later became engaged chiefly in portrait painting. Exhibited regularly in the Nat. Acad. Design. Society of American Artists and other important annual exhibitions.

CHILD, FRANCIS JAMES (1825-1896), scholar and educator, was b. in Boston. He was Boylston professor of rhetoric and oratory at Harvard, later exchanging this post for that of professor of English literature. He was the first authority in the United States on English and Scotch ballads and folk-songs, his work on this subject running to ten volumes.

CHILD, LYDIA MARIA (1802-80), Amer. author and slavery abolitionist.

CHILD, RICHARD WASHBURN (1881), American author and diplomat; b. Worcester, Mass. He graduated from Harvard in 1903, received the degree of LL.B. from that institution in 1906, and in the same year was admitted to the bar. His tastes, however, ran to literature, and he wrote a number of novels that achieved wide popularity. During the World War he was assistant to F. A. Vanderlip in the War Finance work of the United States Treasury Department. In 1919 he became editor of Collier's Weekly. He was appointed Ambassador to Italy by President Harding in 1922 succeeding Thomas Nelson Page.

At the opening of the conference on Near East problems at Lausanne, Switzerland, in 1922, Ambassador Child was directed by the President to act as the American observer at the conference. There his services as mediator and conciliator between the Turkish and Allied delegates were of notable value. On behalf of the United States he set forth the disapproval of this country of the main feature of the Allied plan namely: the setting up of an International Straits Commission. He strongly backed the argument of the Allies for the protection of the Christian minorities declaring that humanitarian interests were as much America's right

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throughout the country. Most of them are federated in the American Humane Association, founded in Cleveland, Ohio, in 1877, but this organization concerns itself with animals as well as with children.

CHILDS, GEORGE WILLIAM (1829-1894), philanthropist and publisher, was b. in Baltimore, Md. For ten years he published the Philadelphia Ledger, making it one of the first cheap newspapers in the United States. It attained a large circulation and considerable influence under his direction. He made gifts of a Shakespeare memorial fountain to Stratford-on-Avon, and a memorial window in Westminster Abbey to Cowper and Herbert.

CHILE, OR CHILI, republic, S. America (17°-55° 58' S., 67°-75° 30' W.), lying along W. coast between main chain of Andes and Pacific; greatest length, 2,661 m.; breadth varies from 60 to 273 m.; bounded N. by Peru, E. by Bolivia and Argentina. Surface generally slopes from E. to W., and also from N. to S., Andes being higher in N. than in S.; average height of Andes about 9,000 ft.—highest peak, Aconcagua, 22,867 ft. Many of these mountains are dormant or sub-dormant volcanoes. From E. to W. there is slope of Andes, central valley tableland, Coast Cordillera, coastal strip; first slopes down as it passes southward and finally dips under sea so that Coast Cordillera takes the form of chain of islands parallel to southern third of coast and curving S. round Tierra del Fuego; Juan Fernandez I., W. of Valparaiso, also belongs to Chile. Climate very varied; desert of Atacama practically rainless; chief rivers are Maipo in valley tableland at Santiago, Biobio at Concepcion, and Valdivia, providing a large amount of potential water-power. Flora includes eucalyptus, cacti, palms, peumo trees, cypress. Fauna includes guanacos, pumas, chinchillas, polecats, lizards, frogs, buzzards, parrots, etc. Largest towns are Santiago, capital, and Valparaiso. Soil of valleys in central provinces is very fertile; over half population engaged in agriculture, producing wheat and other cereals, rearing sheep, cattle, growing vines, oranges, figs, olives, and other fruits, beetroot, producing silk. In S. and islands are dense forests; in N. are enormous deposits of nitrates, which are great source of wealth. Other minerals include salt, borax, copper, silver, tin, manganese, gold, cobalt, iron, sulphur, coal. Industries include copper smelting, sugar refining, tanning, manufacture of soap, candles, chemicals, boots, shoes, textiles. Among exports are honey, copper, nitrates, guano, wool, silver, ore, grains,

flour, skins, furs, borax, caoutchouc, coffee, cotton, Peruvian bark, manganese ore, sugar, vegetables; among imports—textiles, metals, coal, machinery, oilcloth, cordage, tools, earthenware, leather, paper, spirits, scientific instruments, codliver oil, pianos, etc. Railway mileage, 5,105. Transandine Ry. brings Santiago within 36 hours of Buenos Aires. Chile is well provided with telegraphic communications. Area, 289,829 sq. m. Pop. 1920, 3,754,723.

History.—Prehistoric inhabitants of Chile were Yaghans, savages of degraded type, and other tribes of whom most important were Araucanians. Northern districts conquered by Incas of Peru in first half of XV. cent., their control lasting until a cent. later. After Spaniards had conquered Peru, they turned their attention to Chile, first expedition being undertaken by Almargo in 1535, without much success. He was followed by Valdivia, to whom the foundation of Santiago in 1541 is due. He also established the towns of Concepcion, Imperial, Villa Rica, and Valdivia, but was ultimately taken, tortured, and killed by the Indians in revenge for the cruelty with which he had treated them. Warfare between Spaniards and Araucanians continued intermittently for two and a half centuries, and was characteristic of whole colonial period, during which the governors of Chile were generally nominated by viceroys of Peru. A treaty of peace was concluded in 1640, but was again broke out at various dates. Under O'Higgins, governor from 1788 to 1795, considerable progress was made; agriculture, irrigation, commerce, and labor conditions were all improved, and many public buildings erected.

The movement for independence began about 1810, after the abdication of Span. king, Ferdinand VII., which followed the Fr. invasion of Spain. The governor, Carrasco, was compelled by an assembly of patriots to hand in his resignation, and a new system of government was established; abolition of slavery was one of the first laws passed. For some time fighting was carried on with Spaniards; and internal disputes also occurred between rival patriotic parties. For short time, from 1814 to 1817, Span. authority was restored; but in Feb., 1817, the Chileans, under Bernardo, O'Higgins and San Martin, completely defeated the Span. forces at Chacabuco; an assembly was summoned, and O'Higgins became director. Spaniards were again defeated, at Maipo, in 1818, in which year Chilean independence was formally proclaimed. New republic was recognized by U.S. shortly afterwards;

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On the announcement that Peru and Bolivia intended to unite as one republic, Chile declared war against them; and the Confederates were defeated by Chileans under Bulnes at Yungay in 1839. Bulnes became president in 1841. Under his administration no revolutions occurred, and country enjoyed period of peace, during which great progress was made. He was succeeded by Manuel Montt, whose administration was marked by civil war and riots, both of which he succeeded in suppressing; in his time educational and commercial matters were improved, banks founded, and many charitable institutions established. In 1861 Perez became president; in his time occurred dispute with Spain, against whom war was declared by Peru, Chile, Ecuador, and Bolivia. Valparaiso suffered bombardment in 1866, but on withdrawal of Spaniards active hostilities ended in 1869.

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throughout the country. Most of them are federated in the American Humane Association, founded in Cleveland, Ohio, in 1877, but this organization concerns itself with animals as well as with children.

CHILDS, GEORGE WILLIAM (1829-1894), philanthropist and publisher, was b. in Baltimore, Md. For ten years he published the Philadelphia Ledger, making it one of the first cheap newspapers in the United States. It attained a large circulation and considerable influence under his direction. He made gifts of a Shakespeare memorial fountain to Stratford-on-Avon, and a memorial window in Westminster Abbey to Cowper and Herbert.

CHILE, OR CHILI, republic, S. America (17°-55' 58" S., 67°-75' 30" W.), lying along W. coast between main chain of Andes and Pacific; greatest length, 2,661 m.; breadth varies from 60 to 273 m.; bounded N. by Peru, E. by Bolivia and Argentina. Surface generally slopes from E. to W., and also from N. to S., Andes being higher in N. than in S.; average height of Andes about 9,000 ft.—highest peak, Aconcagua, 22,867 ft. Many of these mountains are dormant or subdormant volcanoes. From E. to W. there is slope of Andes, central valley tableland, Coast Cordillera, coastal strip; first slopes down as it passes southward and finally dips under sea so that Coast Cordillera takes the form of chain of islands parallel to southern third of coast and curving S. round Tierra del Fuego; Juan Fernandez I., W. of Valparaiso, also belongs to Chile. Climate very varied; desert of Atacama practically rainless; chief rivers are Maipo in valley tableland at Santiago, Biobio at Concepcion, and Valdivia, providing a large amount of potential water-power. Flora includes eucalyptus, cacti, palms, peumo trees, cypress. Fauna includes guanacos, pumas, chinchillas, polecats, lizards, frogs, buzzards, parrots, etc. Largest towns are Santiago, capital, and Valparaiso. Soil of valleys in central provinces is very fertile; over half population engaged in agriculture, producing wheat and other cereals, rearing sheep, cattle, growing vines, oranges, figs, olives, and other fruits, beetroot, producing silk. In S. and islands are dense forests; in N. are enormous deposits of nitrates, which are great source of wealth. Other minerals include salt, borax, copper, silver, tin, manganese, gold, cobalt, iron, sulphur, coal. Industries include copper smelting, sugar refining, tanning, manufacture of soap, candles, chemicals, boots, shoes, textiles. Among exports are honey, copper, nitrates, guano, wool, silver, ore, grains,

flour, skins, furs, borax, caoutchouc, coffee, cotton, Peruvian bark, manganese ore, sugar, vegetables; among imports—textiles, metals, coal, machinery, oilcloth, cordage, tools, earthenware, leather, paper, spirits, scientific instruments, codliver oil, pianos, etc. Railway mileage, 5,105. Transandine Ry. brings Santiago within 36 hours of Buenos Aires. Chile is well provided with telegraphic communications. Area, 289,829 sq. m. Pop. 1920, 3,754,723.

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Greater China is traversed by two folded mountain systems which stretch from Pamir plateau. To N.E. and N. the Tien-shan extend N.E. to the Khingian Mts. of Manchuria; S. of Taklamakan and Gobi Deserts the Kuen-lun Mts. continue into Ho-nan as the Chin-ling-shan and Fu-nie-shan, in W. Kan-su the branch is the Nan-shan. Mts. of Shantung are isolated system; there are numerous other ranges; in products and climate the Kuen-lun Mts. divide N. and S. China. The alluvial Chinese plain in E. covers over 200,000 sq. m. The principal rivers are the Yang-tse-Kiang, which enters China in Sze-chuen and is navigable for small craft from that prov., from Hankow for ocean vessels, to the sea; the Hoang-Ho, rising in plain of Odontala, and traversing Kan-su and Mongolia to reach the Gulf of Chih-li. Its swift current, sand banks, changes of course, and frequent inundations have gained its name of 'China's Sorrow'; is navigable only in parts. The Si-kiang, flowing through Yunnan, E. to S. China Sea, is navigable by steamers for 200 m. There are numerous canals in Yang-tse valley; the Grand Canal crosses plain from Hangchow to Tien-tsin (850 m.). Chief lakes are Tung-ting, Poyang, and Tai-hu. The Great Wall was completed in 214 B.C. as a defense against northern tribes; length c. 1,500 m. The climate varies greatly from S. to N., and from coast to interior; it is generally monsoon in type with rain between April and Sept. Temperature in N. ranges from 23° to 80° F.; at Peking, in S. from 60° to 85° F.; excessive dryness characterizes interior; The wind-

borne loess soils of the N., the red basin of Cze-chuen, and the river valleys are very fertile. In flora extensive forests are rare; bamboo is of prime importance; camphor tree, maple, ebony, etc.; mulberry for silkworms; fruits. Fauna include tigers, leopards, elephants, and wild boars. Fish rank with rice as staple food. China is very rich in minerals; coalfields enormous (Shansi c. 35,000 sq. m., Hu-nan 20,000 sq. m.); iron, copper, antimony, tin, zinc, etc., worked. Mineral output is restricted by poor transport and communication, antiquated methods and mining restrictions. Chinese are primarily an agricultural people; in S. one-sixth of an acre supports one person, holder of 7 ac. classed as well-to-do; in Manchuria 10 to 30 ac. is common. Farming is intensive; chief crops are rice, wheat, barley, millet, buckwheat, maize, soya bean; tea, cotton, and sugar are important in S. Area under opium poppy decreasing, but still governors of Shen-si and Kwei-chow encourage planting, thus breaking agreement with Great Britain. Stock raising is unimportant. Introduction of machinery is of recent date, and industries, largely in hands of foreigners, date from 1895. China produces much silk, but Chinese manufactures of silks and embroideries, porcelains, paper, lacquer ware, cotton, etc., carried on by manual labor; modern sugar refineries at Hong-Kong, Swatow, and Amoy; iron and steel works at Han-yang, and many flour, rice, and oil mills. Since 1842 Chin. foreign trade has steadily grown; about fifty treaty ports and twenty-five other places open to international trade. Chief exports are silk and manufactures, beans and bean cakes, tea, cotton, skins, and hides, sesamum seeds, tin, etc.; imports are mainly manufactured goods, especially cotton. First railway opened 1876; today railway mileage is 6,835 and over 2,000 m. are in process of construction. In 1913 there were 37,403 m. of telegraph wires, but the telephone had made little headway.

The most populous provs. are Shantung and Kiang-su. By the congestion in great centers, lack of sanitation and hygiene, epidemics, famines, and floods, the death-rate is very high. Over sixty races or tribes are represented in republic and dependencies, comprising Chinese, Manchus, Mongols, Tibetans, etc.; foreign pop. estimated at 150,000 (1913), of whom 80,000 were Japanese, 50,000 Russians, 9,000 British. The religion of China is based on nature worship and ancestor worship; principal religions are Confucianism (adopted as state religion in 1914), Taoism, Buddhism, Mohammedanism, and Christianity; republic shows tendency to religious freedom as

long as ancient family customs are not interfered with.

Art.—Chin. art is perhaps best known to Europeans in its forms of hand embroidery on silk and other fabrics, and enameling on metal. Some of the jars made of *cloisonne* enamel are very beautiful; among others, those of blue enamel on silver may be mentioned. Painting is a very old art in China; it is largely conventional, no shadows being put in. Sculpture includes carvings on ivory, jade, wood, and other substances. Porcelain was discovered many centuries B.C., and is still made in great perfection. The most outstanding feature of Chin. arch. is the tent-like roof.

Education.—Before 1905 education led to an elaborate system of examinations for state employment; since then Western methods have obtained. Peking has a univ. and medical school; in Tien-tsin are a univ., industrial school, medical colleges, mission schools. In 1911 the chief universities of England and America promoted a scheme to establish a modern univ. in Central China. Elementary and secondary schools are rising all over China, and technical instruction in engineering, agriculture, etc., is advancing, while special attention is given to military education. The new Ministry of Education consists of three departments: (1) General knowledge, which supervises general educational matters; (2) special knowledge, for higher education; (3) social training, with charge of popular ceremonies and customs, museums and libraries, music, literature, drama, zoological and botanical gardens, public lectures, etc. The first newspaper in Chinese, *Shen Pao*, or *Shanghai Reporter*, dates from 1870; there are now over 300 daily, weekly, and monthly journals in China.

Literature.—The vastness and variety of Chin. literature is seen in the works collected in 1722. The catalogue is arranged in four divisions: the first contains works on the classics and dictionaries; the second, works on history; the third, works on philosophy and the arts; the fourth, works on poetry and *belles-lettres*. The *Classics* are the Confucian books, and a few others on which much commentary has been expended. The *Histories* of China are in four classes, according to different methods of authors. Very valuable histories of foreign countries, brought into warlike or other contact with China, are added. The *Philosophy and Arts* division deals with the works of the *litterati*; of writers on military affairs, legislation, agriculture, medicine, astronomy, and mathematics, etc., and concludes with works

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CHINA, republic, Asia (18°-50° N., 74°-134° E.); bounded N. by Siberia; E. by Korea, Yellow Sea, China Sea; S. by Fr. Indo-China, India; W. by Afghanistan and Turkestan; includes China proper, with Manchuria, Mongolia, Tibet, and Chin. Turkestan. Area (est.), 4,278,352 sq. miles; pop. China proper, 325,000,000; Greater China, 436,000,000.

Greater China is traversed by two folded mountain systems which stretch from Pamir plateau. To N.E. and N. the Tianshan extend N.E. to the Khingian Mts. of Manchuria; S. of Taklamakan and Gobi Deserts the Kuen-lun Mts. continue into Ho-nan as the Chin-ling-shan and Fu-nie-shan, in W. Kan-su the branch is the Nan-shan. Mts. of Shantung are isolated system; there are numerous other ranges; in products and climate the Kuen-lun Mts. divide N. and S. China. The alluvial Chinese plain in E. covers over 200,000 sq. m. The principal rivers are the Yang-tse-Kiang, which enters China in Sze-chuen and is navigable for small craft from that prov., from Hankow for ocean vessels, to the sea; the Hoang-Ho, rising in plain of Odontala, and traversing Kan-su and Mongolia to reach the Gulf of Chih-li. Its swift current, sand banks, changes of course, and frequent inundations have gained its name of 'China's Sorrow'; is navigable only in parts. The Si-kiang, flowing through Yunnan, E. to S. China Sea, is navigable by steamers for 200 m. There are numerous canals in Yang-tse valley; the Grand Canal crosses plain from Hangchow to Tien-tsin (850 m.). Chief lakes are Tung-ting, Poyang, and Tai-hu. The Great Wall was completed in 214 B.C. as a defense against northern tribes; length c. 1,500 m. The climate varies greatly from S. to N., and from coast to interior; it is generally monsoon in type with rain between April and Sept. Temperature in N. ranges from 23° to 80° F.; at Peking, in S. from 60° to 85° F.; excessive dryness characterizes interior; The wind-

borne loess soils of the N., the red basin of Cze-chuen, and the river valleys are very fertile. In flora extensive forests are rare; bamboo is of prime importance; camphor tree, maple, ebony, etc.; mulberry for silkworms; fruits. Fauna include tigers, leopards, elephants, and wild boars. Fish rank with rice as staple food. China is very rich in minerals; coalfields enormous (Shansi c. 35,000 sq. m., Hu-nan 20,000 sq. m.); iron, copper, antimony, tin, zinc, etc., worked. Mineral output is restricted by poor transport and communication, antiquated methods and mining restrictions. Chinese are primarily an agricultural people; in S. one-sixth of an acre supports one person, holder of 7 ac. classed as well-to-do; in Manchuria 10 to 30 ac. is common. Farming is intensive; chief crops are rice, wheat, barley, millet, buckwheat, maize, soya bean; tea, cotton, and sugar are important in S. Area under opium poppy decreasing, but still governors of Shen-si and Kwei-chow encourage planting, thus breaking agreement with Great Britain. Stock raising is unimportant. Introduction of machinery is of recent date, and industries, largely in hands of foreigners, date from 1895. China produces much silk, but Chinese manufactures of silks and embroideries, porcelains, paper, lacquer ware, cotton, etc., carried on by manual labor; modern sugar refineries at Hong-Kong, Swatow, and Amoy; iron and steel works at Han-yang, and many flour, rice, and oil mills. Since 1842 Chin. foreign trade has steadily grown; about fifty treaty ports and twenty-five other places open to international trade. Chief exports are silk and manufactures, beans and bean cakes, tea, cotton, skins, and hides, sesamum seeds, tin, etc.; imports are mainly manufactured goods, especially cotton. First railway opened 1876; today railway mileage is 6,835 and over 2,000 m. are in process of construction. In 1913 there were 37,403 m. of telegraph wires, but the telephone had made little headway.

The most populous provs. are Shantung and Kiang-su. By the congestion in great centers, lack of sanitation and hygiene, epidemics, famines, and floods, the death-rate is very high. Over sixty races or tribes are represented in republic and dependencies, comprising Chinese, Manchus, Mongols, Tibetans, etc.; foreign pop. estimated at 150,000 (1913), of whom 80,000 were Japanese, 50,000 Russians, 9,000 British. The religion of China is based on nature worship and ancestor worship; principal religions are Confucianism (adopted as state religion in 1914), Taoism, Buddhism, Mohammedanism, and Christianity; republic shows tendency to religious freedom as

long as ancient family customs are not interfered with.

Art.—Chin. art is perhaps best known to Europeans in its forms of hand embroidery on silk and other fabrics, and enameling on metal. Some of the jars made of *cloisonne* enamel are very beautiful; among others, those of blue enamel on silver may be mentioned. Painting is a very old art in China; it is largely conventional, no shadows being put in. Sculpture includes carvings on ivory, jade, wood, and other substances. Porcelain was discovered many centuries B.C., and is still made in great perfection. The most outstanding feature of Chin. arch. is the tent-like roof.

Education.—Before 1905 education led to an elaborate system of examinations for state employment; since then Western methods have obtained. Peking has a univ. and medical school; in Tien-tsin are a univ., industrial school, medical colleges, mission schools. In 1911 the chief universities of England and America promoted a scheme to establish a modern univ. in Central China. Elementary and secondary schools are rising all over China, and technical instruction in engineering, agriculture, etc., is advancing, while special attention is given to military education. The new Ministry of Education consists of three departments: (1) General knowledge, which supervises general educational matters; (2) special knowledge, for higher education; (3) social training, with charge of popular ceremonies and customs, museums and libraries, music, literature, drama, zoological and botanical gardens, public lectures, etc. The first newspaper in Chinese, *Shen Pao*, or *Shanghai Reporter*, dates from 1870; there are now over 300 daily, weekly, and monthly journals in China.

Literature.—The vastness and variety of Chin. literature is seen in the works collected in 1722. The catalogue is arranged in four divisions: the first contains works on the classics and dictionaries; the second, works on history; the third, works on philosophy and the arts; the fourth, works on poetry and *belles-lettres*. The *Classics* are the Confucian books, and a few others on which much commentary has been expended. The *Histories* of China are in four classes, according to different methods of authors. Very valuable histories of foreign countries, brought into warlike or other contact with China, are added. The *Philosophy and Arts* division deals with the works of the *literati*; of writers on military affairs, legislation, agriculture, medicine, astronomy, and mathematics, etc., and concludes with works

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The political difficulties of China following the World War were many and complicated. Japan, having captured from Germany during the war the fortress of Kiau Chau, in the Province of Shantung, formerly owned by Germany which had seized it from China, the Peace Conference of Paris awarded the territory to Japan over the protest of China and in spite of the objections of American delegates, which, however, were withdrawn. Japan agreed to withdraw her military forces from Shantung, the province in which Kiau-Chau was situated, and to ultimately return to China full sovereignty over this territory. No date for this return, however, was specified, and concessions were made

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to Japan in relation to railway and trade. This decision aroused the greatest resentment among Chinese delegates of the Conference and they refused to sign the treaty. This was one of the matters taken up in the Conference on the Limitation of Armaments held in Washington in 1921-2. A treaty was drawn up between Japan and China which provided for the return of Shantung to China and the transfer to China was practically made in 1922. The Conference also passed several other treaties which affected China, assuring the 'open door,' modifying postal regulations and making other concessions favorable to China. See CONFERENCE ON THE LIMITATION OF ARMAMENTS.

The country was in a state of civil war during the period of 1920 to 1923. The Anfu party was crushed by the Chihli party, and Chang Tso-Lin in 1920 brought about a revolt in South China, which culminated in the declaration of an independent republic with the capital at Canton. This was divided into several semi-independent governments, and Sun Yat Sen, the famous revolutionary leader, was recognized as president of the southern republic. There were thus two presidents in China, one at Canton and one at Peking. In 1922 the two Chang-Tso-Lin, Tuchun, or war lord of Manchuria, and Wu Pei-Fu of central China, engaged in a campaign for the domination of the country. Chang Tso-Lin had the support of Sun Yat Sen. Both declared their purpose as the unification of all China. On May 4, 1922 Wu Pei-Fu decisively defeated Chang Tso-Lin near Peking and the latter retreated to the pursued by the victor. Wu Pei-Fu was then recognized by the Peking government. On June 2, President Hsu-Shih-Chang resigned office and was succeeded by Li-Yuan-Hung, who was president in 1916. Dr. Sun Yat Sen, following the defeat of his ally, was attacked with his forces in Canton and escaped only by taking refuge in a British gunboat. He was deposed as president by the Canton parliament. He later agreed to support the administration of the new President but in February, 1923, again headed a revolt and General Hsu-Tsung-Chi, with 40,000 troops, advanced upon Canton to reclaim that city for Dr. Sun Yat Sen. The internal condition of China in 1923 was such that there was actually no responsible government in control.

In addition to political troubles, terrible famines inflicted the country in 1920-1, causing the death of hundreds of thousands of people. Relief was administered by the United States and other countries.

In February, 1923 the American, British, French and Japanese govern-

ments submitted a joint note to the Chinese government on the critical condition of finances, urging drastic reforms.

In Oct. 1923, Tsas Kun, chief of the North, was elected president to succeed Li-Yuan-Hung who resigned in August.

CHINA, GREAT WALL OF. See CHINA, HISTORY.

CHINA SEA, part of Pacific Ocean, stretching from Corea to Siam.

CHINANDEGA, CHINENDEGA (12° 38' N., 87° 36' W.), town (and department), W. Nicaragua; bananas, sugarcane, and cotton cultivated. Pop. 11,000.

CHI-NAN-FU (36° 40' N., 117° E.), town, capital of Shan-tung, China; commercial center. Pop. 300,000.

CHINCHA ISLANDS (13° 45' S., 76° 28' W.), group of three rocky islands off coast of Peru; formerly noted for large deposits of guano.

CHINCHEW, TSUAN-CHOW (24° 58' N., 118° 32' E.), seaport, Fo-kien, China; tea and sugar exported.

CHINCHILLA (*C. lanigera*), rodent about the size of a squirrel living in high altitudes in Peru and Chile, burrowing among loose rocks; prized for its soft pearly grey fur.

CHINDA, VISCOUNT SUTEMI, a Japanese diplomat (1856), b. in Hiroaki, and educated at Depauw University, U.S.A. In 1886 he entered the Japanese Foreign Office, four years later was consul in San Francisco, and in 1895 Consul-general in Shanghai. In 1897 he went to Brazil as Minister Resident, and during the following three years went in the same capacity to Holland, Denmark, Russia, Sweden and Norway. In 1901 he became Vice-Minister of Foreign Affairs; in 1908, Ambassador to Germany, and during 1911-16 he was Ambassador to the United States. He was Ambassador to England from 1916 till 1920 when he was made a member of the Privy Council and of the Advisory Board on Diplomatic Affairs. He was chief of the suite of the Japanese Crown Prince on his tour to Europe in 1921.

CHINDE (18° 33' S., 36° 30' E.), port at mouth of Chinde R., Portug. E. Africa; only navigable mouth of Zambesi; chief port for Zambesi valley and Nyasaland; exports coffee and rubber. Pop. 3,000.

CHINDWIN (c. 25° N., 95° E.), river, Burma; principal tributary of Irrawadi; rises Patkoi Hills; flows S.; joins Irra-

wadi between Mandalay and Pagan; navigation difficult owing to whirlpools and sandbanks.

CHINDWIN (c. 22° 30' N., 95° E.), two districts (Upper and Lower), Sagaing division, Upper Burma; hilly; valuable teak wood forests; extensive coalfields; indigo and rice cultivated; areas, 19,062 and 3,480 sq. miles. Pops. 155,000 and 276,000.

CHINGFORD (51° 38' N., 0°), village, Essex, England; tourist resort: ancient ruined church.

CHINGLEPUT, CHENGALPAT (12° 42' N., 80° 1' E.), town (and district), Madras, India; soil poor, badly watered; town noted for pottery manufacture; C. taken from Fr. by Brit. 1752. Pop. 10,700.

CHINKIANG (32° 10' N., 119° 30' E.), treaty port on Yangtze-kiang, Kiang-su, China; taken by British, 1842. Pop. 1921, 477,591.

CHINON (47° 10' N., 0° 14' E.), town, Indre-et-Loire, France; ruins of ancient royal castle; birthplace of Rabelais; trades in brandy and red wine. Pop. 5,000.

CHINOOK, tribe of American Indians of Oregon; name of warm wind experienced over E. slopes of the Rocky Mts.

CHINSURA (22° 53' N., 88° 23' E.), town, on Hughli, Bengal, India; military station; ceded to British by Dutch, 1825. Pop. 30,000.

CHINTZ, gaily-printed, glazed calico, used for hangings, curtains, etc.

CHIOGGIA, CHIOZZA (45° 12' N., 12° 17' E.), seaport, Italy; built on piles in Venetian lagoon, connected by bridge with mainland; has cathedral (built XVII. cent.) and old corn-hall; seat of bishopric; has fortified harbor; fisheries important; has shipbuilding yards; manufactures of bricks, sails, etc.; flax-spinning carried on. Pop. 31,000.

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to Japan in relation to railway and trade. This decision aroused the greatest resentment among Chinese delegates of the Conference and they refused to sign the treaty. This was one of the matters taken up in the Conference on the Limitation of Armaments held in Washington in 1921-2. A treaty was drawn up between Japan and China which provided for the return of Shantung to China and the transfer to China was practically made in 1922. The Conference also passed several other treaties which affected China, assuring the 'open door,' modifying postal regulations and making other concessions favorable to China. See CONFERENCE ON THE LIMITATION OF ARMAMENTS.

The country was in a state of civil war during the period of 1920 to 1923. The Anfu party was crushed by the Chihli party, and Chang Tso-Lin in 1920 brought about a revolt in South China which culminated in the declaration of an independent republic with the capital at Canton. This was divided into several semi-independent governments, and Sun Yat Sen, the famous revolutionary leader, was recognized as president of the southern republic. There were thus two presidents in China, one at Canton and one at Peking. In 1922 the two Chang-Tso-Lin, Tuchun, or war lord of Manchuria, and Wu Pei-Fu of central China, engaged in a campaign for the domination of the country. Chang Tso-Lin had the support of Sun Yat Sen. Both declared their purpose as the unification of all China. On May 4, 1922 Wu Pei-Fu decisively defeated Chang Tso-Lin near Peking and the latter retreated to the pursued by the victor. Wu Pei-Fu was then recognized by the Peking government. On June 2, President Hsu-Shih-Chang resigned office and was succeeded by Li-Yuan-Hung, who was president in 1916. Dr. Sun Yat Sen, following the defeat of his ally, was attacked with his forces in Canton and escaped only by taking refuge in a British gunboat. He was deposed as president by the Canton parliament. He later agreed to support the administration of the new President but in February, 1923, again headed a revolt and General Hsu-Tsung-Chi, with 40,000 troops, advanced upon Canton to reclaim that city for Dr. Sun Yat Sen. The internal condition of China in 1923 was such that there was actually no responsible government in control.

In addition to political troubles, terrible famines afflicted the country in 1920-1, causing the death of hundreds of thousands of people. Relief was administered by the United States and other countries.

In February, 1923 the American, British, French and Japanese govern-

ments submitted a joint note to the Chinese government on the critical condition of finances, urging drastic reforms.

In Oct. 1923, Tsas Kun, chief of the North, was elected president to succeed Li-Yuan-Hung who resigned in August.

CHINA, GREAT WALL OF. See CHINA, HISTORY.

CHINA SEA, part of Pacific Ocean, stretching from Corea to Siam.

CHINANDEGA, CHINENDEGA (12° 38' N., 87° 36' W.), town (and department), W. Nicaragua; bananas, sugarcane, and cotton cultivated. Pop. 11,000.

CHI-NAN-FU (36° 40' N., 117° E.), town, capital of Shan-tung, China; commercial center. Pop. 300,000.

CHINCHA ISLANDS (13° 45' S., 76° 28' W.), group of three rocky islands off coast of Peru; formerly noted for large deposits of guano.

CHINCHEW, TSUAN-CHOW (24° 58' N., 118° 32' E.), seaport, Fo-kien, China; tea and sugar exported.

CHINCHILLA (*C. lanigera*), rodent about the size of a squirrel living in high altitudes in Peru and Chile, burrowing among loose rocks; prized for its soft pearly grey fur.

CHINDA, VISCOUNT SUTEMI, a Japanese diplomat (1856), b. in Hirosaki, and educated at Depauw University, U.S.A. In 1886 he entered the Japanese Foreign Office, four years later was consul in San Francisco, and in 1895 Consul-general in Shanghai. In 1897 he went to Brazil as Minister Resident, and during the following three years went in the same capacity to Holland, Denmark, Russia, Sweden and Norway. In 1901 he became Vice-Minister of Foreign Affairs; in 1908, Ambassador to Germany, and during 1911-16 he was Ambassador to the United States. He was Ambassador to England from 1916 till 1920 when he was made a member of the Privy Council and of the Advisory Board on Diplomatic Affairs. He was chief of the suite of the Japanese Crown Prince on his tour to Europe in 1921.

CHINDE (18° 33' S., 36° 30' E.), port at mouth of Chinde R., Portug. E. Africa; only navigable mouth of Zambesi; chief port for Zambesi valley and Nyasaland; exports coffee and rubber. Pop. 3,000.

CHINDWIN (c. 25° N., 95° E.), river, Burma; principal tributary of Irrawadi; rises Patkol Hills; flows S.; joins Irra-

wadi between Mandalay and Pagan; navigation difficult owing to whirlpools and sandbanks.

CHINDWIN (c. 22° 30' N., 95° E.), two districts (Upper and Lower), Sagaing division, Upper Burma; hilly; valuable teak wood forests; extensive coalfields; indigo and rice cultivated; areas, 19,062 and 3,480 sq. miles. Pops. 155,000 and 276,000.

CHINGFORD (51° 38' N., 0°), village, Essex, England; tourist resort: ancient ruined church.

CHINGLEPUT, CHENGALPAT (12° 42' N., 80° 1' E.), town (and district), Madras, India; soil poor, badly watered; town noted for pottery manufacture; C. taken from Fr. by Brit. 1752. Pop. 10,700.

CHINKIANG (32° 10' N., 119° 30' E.), treaty port on Yangtze-kiang, Kiang-su, China; taken by British, 1842. Pop. 1921, 477,591.

CHINON (47° 10' N., 0° 14' E.), town, Indre-et-Loire, France; ruins of ancient royal castle; birthplace of Rabelais; trades in brandy and red wine. Pop. 5,000.

CHINOOK, tribe of American Indians of Oregon; name of warm wind experienced over E. slopes of the Rocky Mts.

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CHOCTAWS, large tribe of American Indians of the Muskogean family, now living in Oklahoma; they sided with the Confederates in the Civil War.

CHODKIEWICZ, JAN KAROL (1560-1621), Polish general; won the victory of *Kirkolm* over the Swedes in 1605; fought also against Muscovy, 1617, and against the Turks, dying during the campaign.

CHOISEUL, ETIENNE FRANÇOIS, DUC DE (1719-85), Fr. statesman; served in army, 1741-48; became ambassador at Rome, 1753, and at Vienna, 1757, then duke and peer of France; directed the foreign affairs of France with great ability, till 1770, when he fell from power and retired.



